Regional Municipality of Ottawa-Carleton Planning Department March, 1984

official plan review

DISCUSSION PAPER

# REGIONAL DEVELOPMENT STRATEGY

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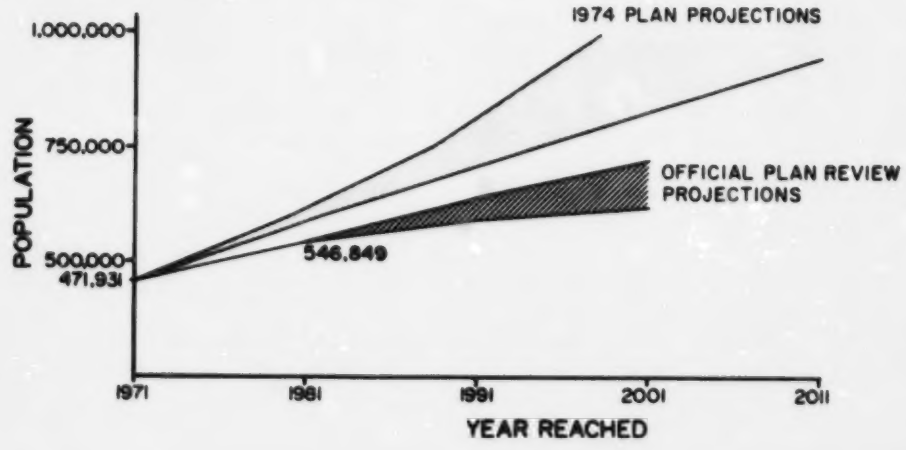
## WHY AN OFFICIAL PLAN REWIEW

The Official Plan for the Ottawa-Carleton planning area was adopted by Regional Council on 9 October, 1974. This Plan contains Council's strategy for physical planning and it has guided the development of the Region since that date through the approval of local official plans of subdivision and condominium, and the building of major roads, transitways, sewers, and water mains. The Plan has also given direction to the various activities of both the Region and the area municipalities and their boards and commissions which are all subject to the provisions of the Plan.

A major premise of the Plan is that the population of the Regional Municipality of Ottawa-Carleton could reach one million people about the turn of the century. Recent analyses show that it is most unlikely that this population level will be attained.

FIGURE : 1

**R.M.O.C. POPULATION PROJECTIONS**




But perhaps more significant is that although population growth has slowed, the level of job creation and the requirement for new houses, sewage and water services and transportation facilities has not shown equivalent declines. In short, fewer people are consuming more serviced land, housing, and transportation services.

So, while population has not been increasing as rapidly as projected, jobs and the buildings that contain them, houses and the lands these sit on have been increasing at rates much closer to those anticipated in the Plan. As a result, urban land is being developed nearly as quickly as foreseen and the need for Regional services has been expanding at a rapid rate as well.

A major reason for this is that the economic development of the Region has provided the population that was already here with more jobs, places of work and businesses as well as more houses than before - quite apart from some new opportunities for those moving into the Region. In fact, in the period 1971-81 approximate-

ly two thirds of the houses built would have been built even if the population had not increased by a single person.

These changes in the relationships between people, jobs, housing, land and servicing requirements warrant a thorough review of the Regional Plan. It is time to take stock, see where we are, what we have achieved, and look forward to where we are heading.

It is important to recognize at the outset however that the Official Plan Review can not start from a "clean slate". The 1974 Plan established a basic "strategy" or direction for growth from which it will be difficult to deviate, particularly in the short- term. Policies are in place, and committments have been made to provide services to many areas identified in the Plan for future urban growth. This review, therefore, is concerned primarily with what might happen after the late 1980's into the 1990's and beyond.

In addition to the changes in the way the Region is developing, there have been changes in the way planning is conducted. In the early 70's when the Regional Plan was being formulated, very few of the Region's municipalities had planning departments or their own local plans. This has since changed and approved local official plans are now in place across the Region. It is, therefore, an opportune time to raise the question of the appropriate role of regional planning and the degree to which it might have changed with respect to its proper emphasis and level of detail.

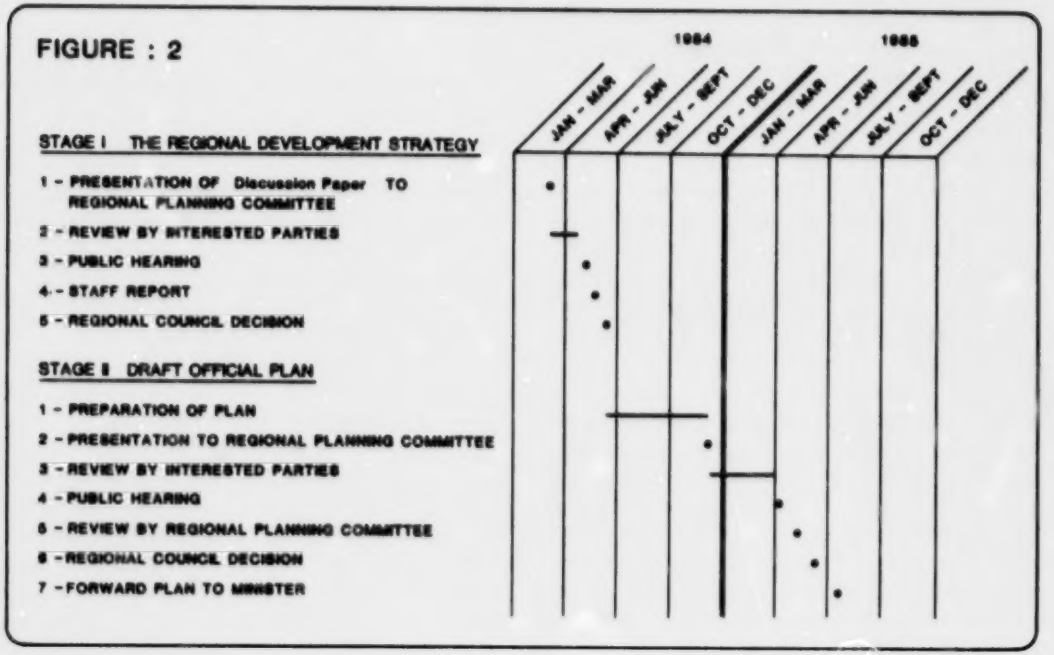
## Objectives

The objectives of the Official Plan Review are to examine the directions in which the Region might evolve, to confirm the policies of the official plan where they are still valid and to make adjustments where necessary. And, at the same time there is the opportunity to bring the Official Plan up to date with regard to the new Planning Act and current practice with regard to the relationship between the planning responsibilities of the Region and the area municipalities.

## Process and Timing

A two stage process of public consultation and decision making by Regional Council is envisaged as shown in Figure 2. This report is

**FIGURE : 2**


1984
1985
JAN - MAR
APR - JUN
JULY - SEPT
OCT - DEC
JAN - MAR
APR - JUN
JULY - SEPT
OCT - DEC
STAGE I THE REGIONAL DEVELOPMENT STRATEGY
1 - PRESENTATION OF Discussion Paper TO REGIONAL PLANNING COMMITTEE
2 - REVIEW BY INTERESTED PARTIES
3 - PUBLIC HEARING
4 - STAFF REPORT
5 - REGIONAL COUNCIL DECISION
STAGE II DRAFT OFFICIAL PLAN
1 - PREPARATION OF PLAN
2 - PRESENTATION TO REGIONAL PLANNING COMMITTEE
3 - REVIEW BY INTERESTED PARTIES
4 - PUBLIC HEARING
5 - REVIEW BY REGIONAL PLANNING COMMITTEE
6 - REGIONAL COUNCIL DECISION
7 - FORWARD PLAN TO MINISTER

the source document for the consultation and decision-making process relating to the first stage. It deals with what is termed the Regional Development Strategy which will be Regional Council's basic stance towards the provision for and accommodation of growth within the Region to 2001 and beyond.

In the second stage, a draft Official Plan (or amendment) will be presented. This draft will incorporate the strategy (which will be adopted at the end of stage one) and provide all of the detailed policies to implement it. As in the first stage, the draft Official Plan will be presented to the public for consultation preceding decision-making by Regional Council.

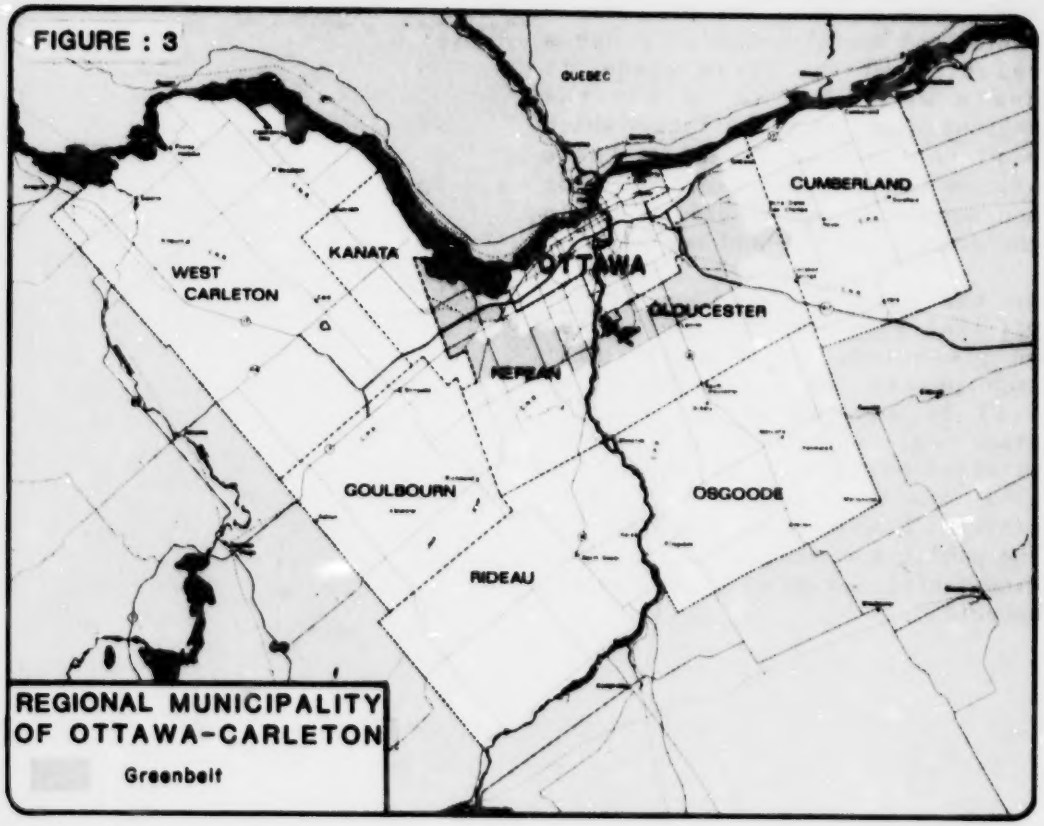
## EXISTING REGIONAL DEVELOPMENT STRATEGY

The regional development strategy upon which the existing official plan policies are based contains the following major elements.

The Region is divided into two basic land-use areas: one being rural - consisting of farm lands, wooded lands, villages and estate lots; the second being urban - consisting of the built up areas of Ottawa, Vanier, Rockcliffe Park, Nepean and Gloucester plus the three emerging urban communities of Kanata, Orleans and Barrhaven. The federal Greenbelt separates the three urban communities from the older urban areas.

Of the total population growth, 90% is intended to be housed in the urban area, with the remainder located in the rural area, evenly divided between growth in villages and on country estate lots.

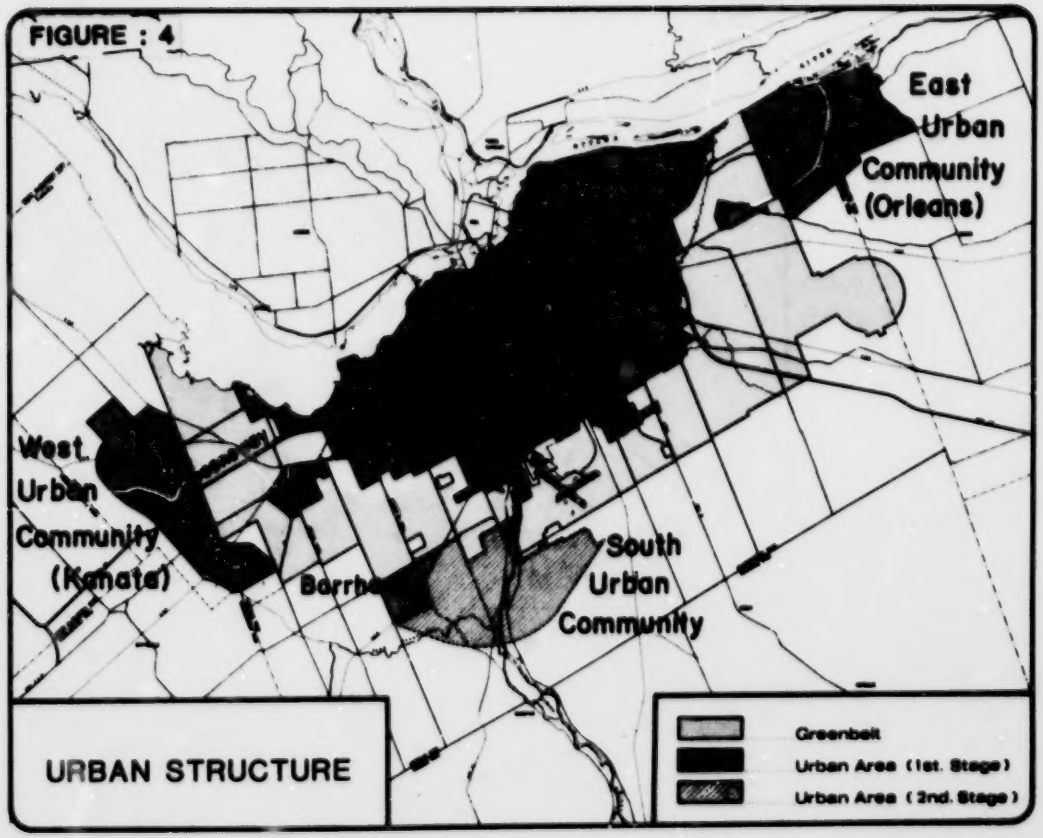
FIGURE : 3



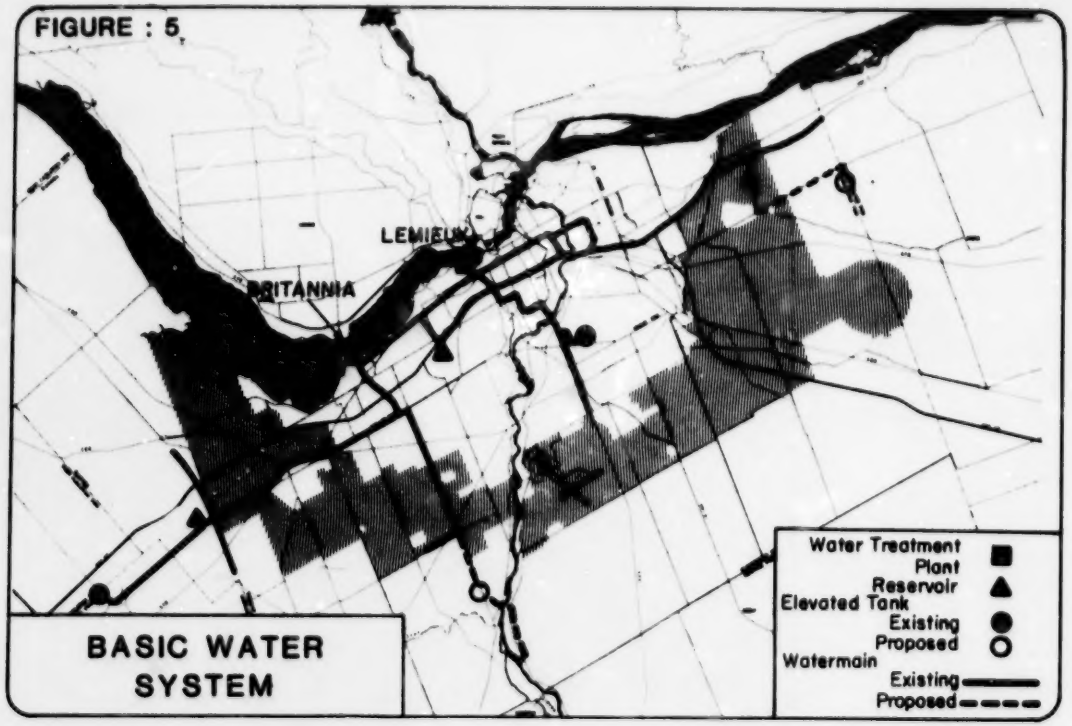
Urban growth will occur in two stages - the "first stage" consisting of all lands inside the Greenbelt, the West Urban Community (Kanata), the East Urban Community (Orleans), and Barrhaven. The "second stage" is growth south of the Greenbelt (i.e. the South Urban Community - of which Barrhaven is the first phase). Refer to Figure 4.

Water and sewer services are to be provided to all areas designated for urban development (concentrating initially on the "first stage" lands). Further, consideration will be given to extending services to rural villages which were known to have sanitation problems in 1974 (eg. Stittsville, Richmond and Manotick).

FIGURE : 4

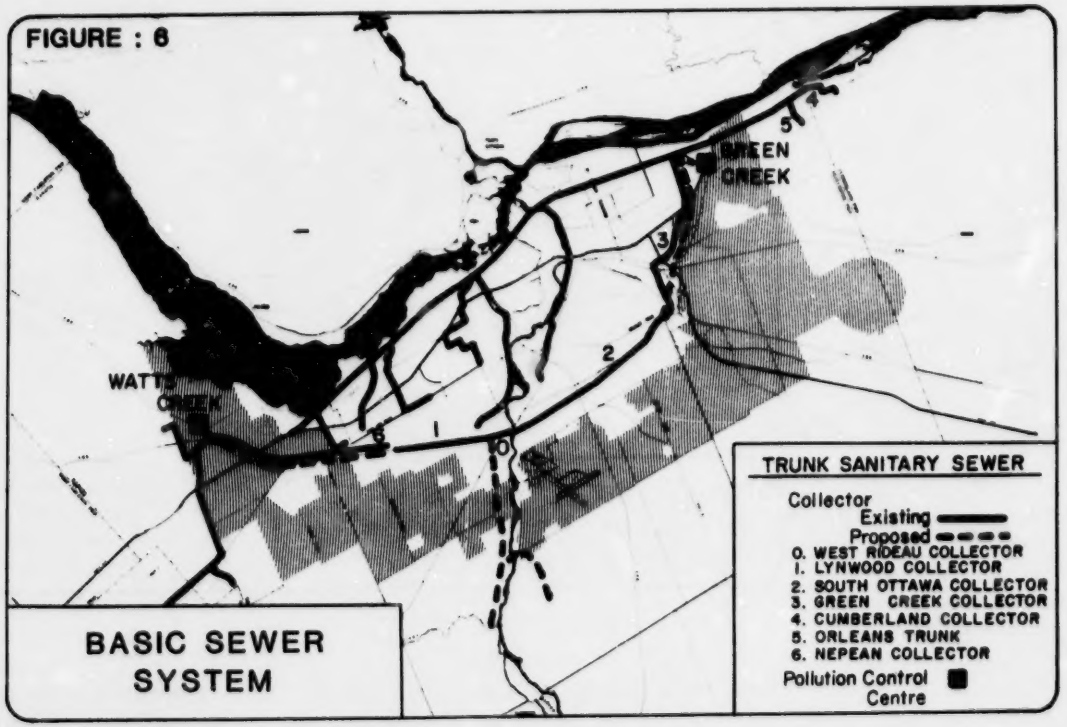


Water for the urban area is to be supplied from the Ottawa River via two filtration plants - one at Britannia and the other on Lemieux Island. Service to the urban communities will be progressively expanded through a system of feeder mains, reservoirs, and elevated tanks. Refer to Figure 5.



Sewage treatment is now provided at two locations - The Watts Creek Sewage Treatment Plant (in the west) and the Green Creek Pollution Control Centre (in the east).

The Plan provides for the phasing out of the former and the expansion of the latter. Before this can take place, a large sewer has to be extended to the west to intercept the sewage flows currently treated at the Watts Creek Plant. Part of that sewer has been constructed but major extensions are still required. Refer to Figure 6.



There will be a substantial increase in employment levels both in the suburbs inside the Greenbelt and in the urban communities outside the Greenbelt.

Although growth in the federal civil service is expected to continue, the Plan calls for an increasingly diversified employment base (proportionally more manufacturing and service sector jobs).

Employment in the central area can expand to the limit of the capacity of the existing road system (in 1974 that limit was judged to be approximately 100,000 jobs).

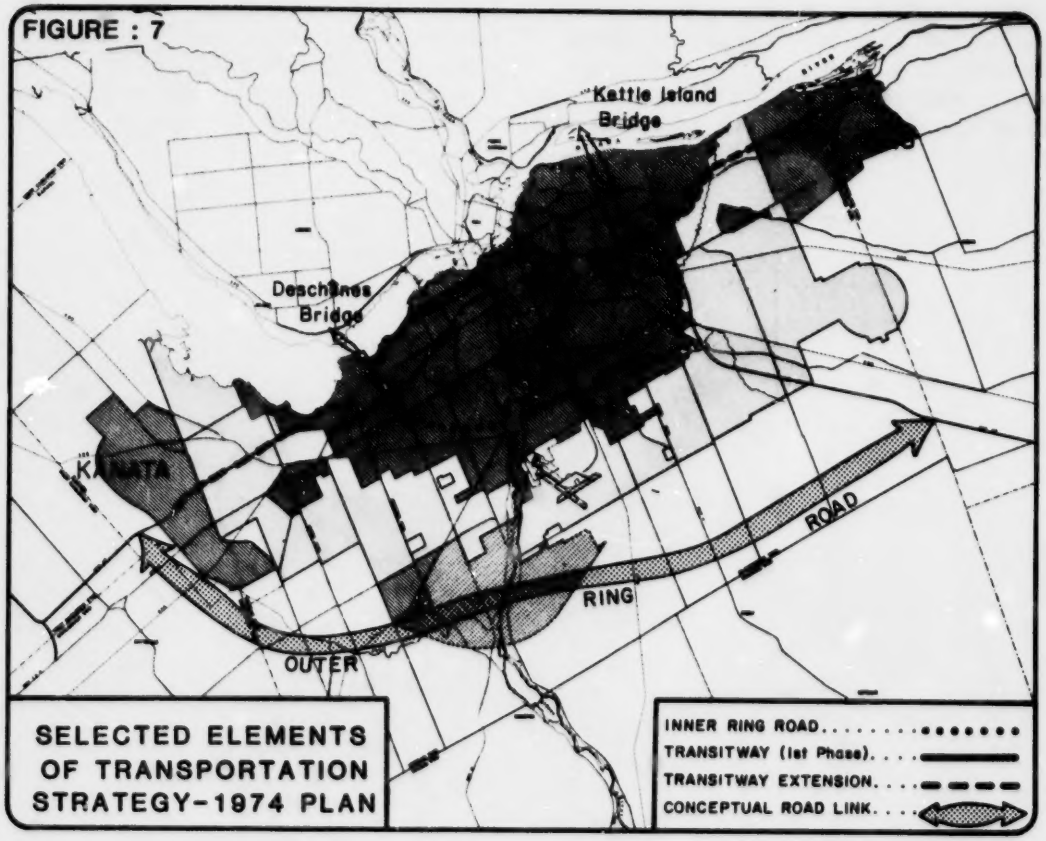
With regard to transportation, the development of the public transit system has priority over the construction of new roads or the widening of existing roads.

However some new road links are proposed, notably two new bridges across the Ottawa River at Kettle Island and Deschenes along with accompanying approach roads and a new east/west route known as the inner ring road inside the Greenbelt between Hunt Club Road and Heron Road. And eventually an outer ring road will link the three urban communities outside the Greenbelt. Refer to Figure 7.

A major thrust of the existing development strategy is to develop a rapid transit system in Ottawa-Carleton and have the urban structure evolve in such a way as to support it (e.g. by establishing employment at sub-centres served by the rapid transit system).

In summary, the Plan seeks to direct growth in the rural area thereby protecting agricultural lands and environmental resources; to balance urban growth inside and outside the Greenbelt; to protect inner city neighbourhoods from the disruption caused through major expansion of the road system by fostering a successful rapid transit program; and to diversify the regional employment base.

FIGURE : 7



Some of this has been achieved. In large part, our agricultural lands have been protected from development and land has been acquired by the Region in designated natural environment areas for their preservation for future generations. The communities of Orleans, Kanata and Barrhaven have been provided with water and sewer services and are now attracting approximately one third of new urban residential development (which accounts for nearly all of the net increase in population). The first part of the transitway system, which will ultimately service the entire urban area, is under construction and the Region's employment base is both expanding, and diversifying. In fact, the Official Plan Review has not discovered great faults with the basic strategy that was set in place with the 1974 Plan.

However, even though growth has slowed, changes in the relationships between population, employment and household growth and the emerging development pattern has given rise to the need for a major program of infrastructure improvement (roads, transit, sewer and water systems), the need for which will be felt in the near to mid-term.

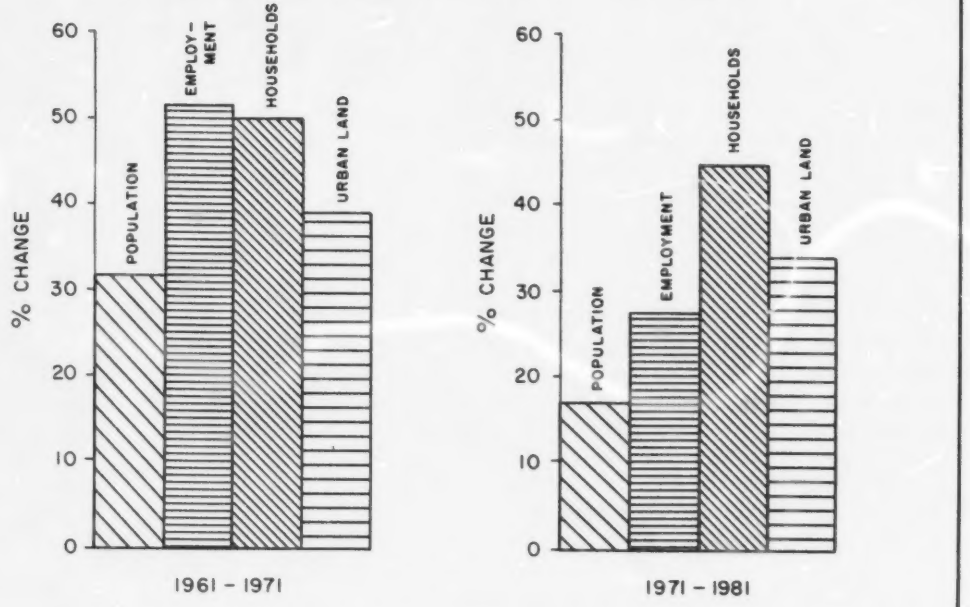
The following sections of this report highlight some of the basic changes that have been occuring in the Region and the issues these raise. This is followed by a review of the options we see for the future development of the Region - and the steps we need to take in order to achieve them.

## CURRENT TRENDS AND PROJECTIONS

The 1974 Official Plan is based on certain assumptions relating to future levels of employment, population, households and the consumption of urban land. These were derived from information which appeared reasonable in the late 1960's and the early 1970's. Figure 8 shows the changes which have taken place in the preceding two decades (1961-1971 and 1971-1981) with regard to the four key factors mentioned above. In order to discover what influences are important with regard to shaping our future, it is important to understand why these changes took place and come to some conclusion about the likely direction and magnitude of future change.

FIGURE : 8

**% CHANGE IN POPULATION, EMPLOYMENT, HOUSEHOLDS, URBAN LAND, 1961 - 1981**




### Growth Prospects

In preparing for the Official Plan Review, planning staff produced projections of population growth, employment growth, household formation and land requirements. The emphasis of this work was to arrive at projections which were realistic (ie. bear clear relationship to past experience and future possibilities) and to achieve consistency between all aspects (eg. to make sure the projections of employment growth, population growth, and household formation were logically consistent with each other). Refer to Figure 9.

In this regard, two projections were produced which define the range (low-high) within which we expect population growth to occur. Recent analyses have shown that the key determinant of population growth is not the balance between

births and deaths. Rather, it is the economy which sets the pace for job creation, which in turn influences the level of net in-migration (net in-migration is the balance between migration to and from the Region).

FIGURE : 9

CHANGES 1981 to 2001

| | Low Projection | High Projection |
|---|---|---|
| **Population** | 76,000 | 176,000 |
| **Employment** | 59,000 | 149,000 |
| **Households** | 55,000 | 91,000 |
| **Urban Land (ha)** | 3,650 to 5,520 | 5,510 to 8,330 |

The low projection assumes that the growth rate experienced during the slowest period of growth in the last twenty years (1976-81) will return and continue unabated - to the end of the projection period (2001). This is a rather pessimistic projection.

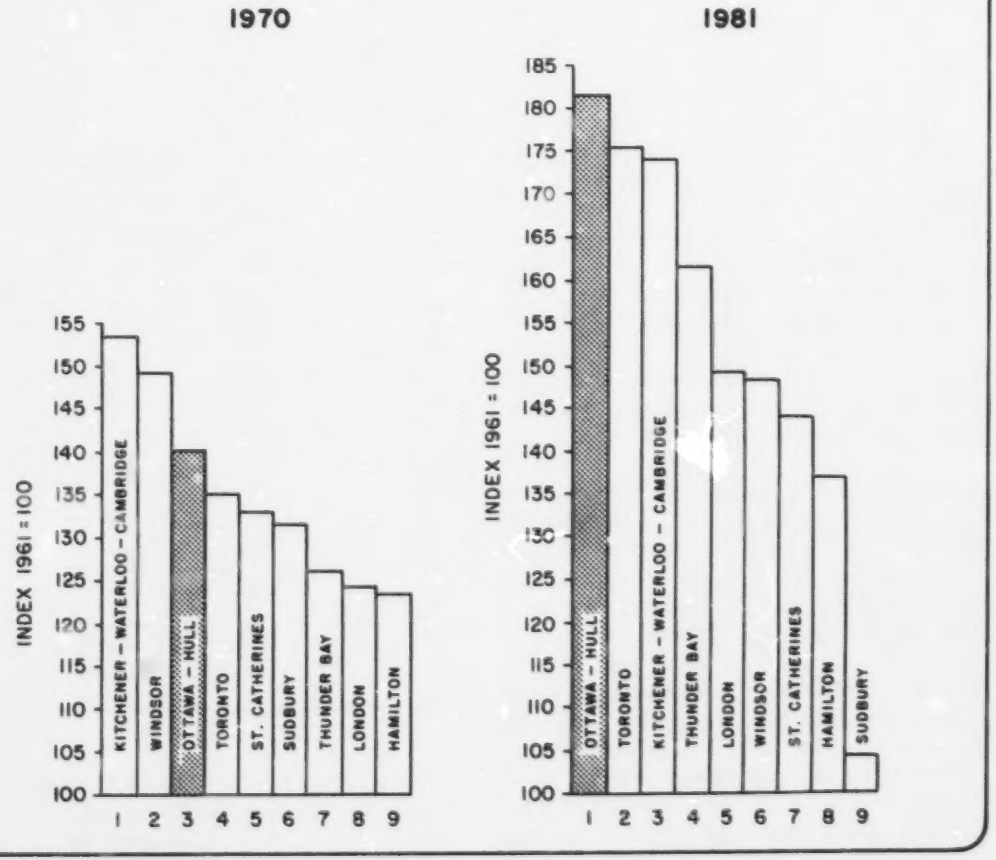
The high projection is based on migration rates 20% higher than the average experienced over the last twenty years occuring, on a continuous basis, to 2001. This is a rather optimistic projection. More details regarding these projections are provided in Appendix 2. In addition, a list of technical studies prepared by the planning staff as the basis of this Official Plan Review is provided in Appendix 1.

## Jobs

Compared to other urban areas in Ontario, employment growth in Ottawa-Carleton has been very strong, moving us from third place in 1970 (behind Windsor and Kitchener) to first place in 1981 (ahead of Toronto and Windsor). Figure 10 shows the employment growth for nine Ontario urban centres. The employment index for

FIGURE : 10

EMPLOYMENT INDEX FOR NINE MAJOR ONTARIO CITIES



each centre relates to the percentage change in employment since 1961 (ie. for each centre the index for 1961 = 100.0).

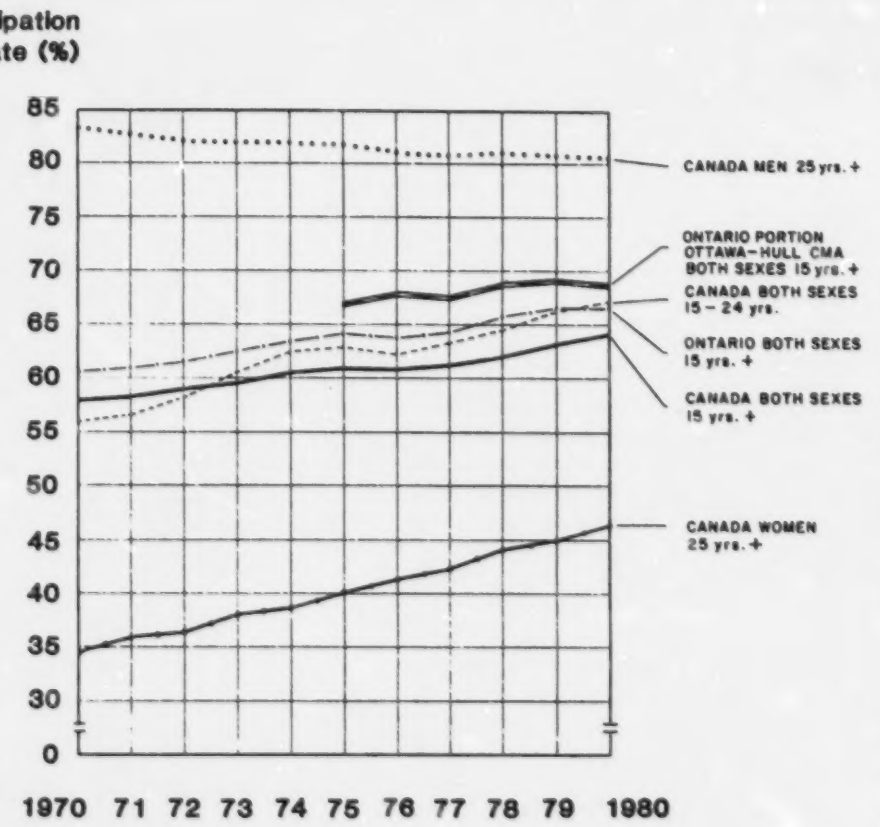
In Ottawa-Carleton, more jobs were created in the last decade than in the 1961-1971 period, but each job is supporting fewer people than was the case a decade ago. That is, job creation has outpaced population growth. In other words, the overall "participation rate" has been increasing. This is due to many factors including increased levels of education; a rapid growth in the service sector which has led to work opportunities especially for those with little previous work experience; an increase in the cost of living resulting in the desire for more than one income earner per household; and a growth in the "consumer society" with an increased demand for goods and services. Refer to Figure 11.

Many of the jobs which have been created however, are part-time. Between 1976 and 1981, 61% of new jobs were part-time - bringing part-time jobs to approximately 17% of total employment.

Since a reliable forecast of economic conditions into the distant future is virtually impossible to construct, a true employment projection was not attempted. Instead, the number of jobs required to support the "high" and "low" population projection was calculated. These figures were then checked for their reasonableness by a review of growth prospects for each employment sector. The

FIGURE : 11

HISTORICAL PARTICIPATION RATES



total number of jobs to support the high and low population projection was shown in Figure 9.

In addition to the expansion of the employment base, the existing official plan calls for an increasing diversification of the local economy away from a dependence on federal employment. It was recognized however, that throughout the planning period the Federal Government would remain the single major employer in the Region. Recent figures show that the trend is in the anticipated direction as a result of, on the one hand, the slow down in federal employment growth in the national capital region as a whole and the transfer of employees from Ottawa-Carleton to Hull. And, on the other hand there is the increasing strength of the high technology, tourism and service industries which are bringing increased diversity to the job market. The net result of these two effects is that the percentage of jobs in the federal sector has declined from 38.5% in 1976 to 33.2% in 1981, (notwithstanding the fact that there has been a net increase in the actual number of federal jobs in the National Capital Region ).

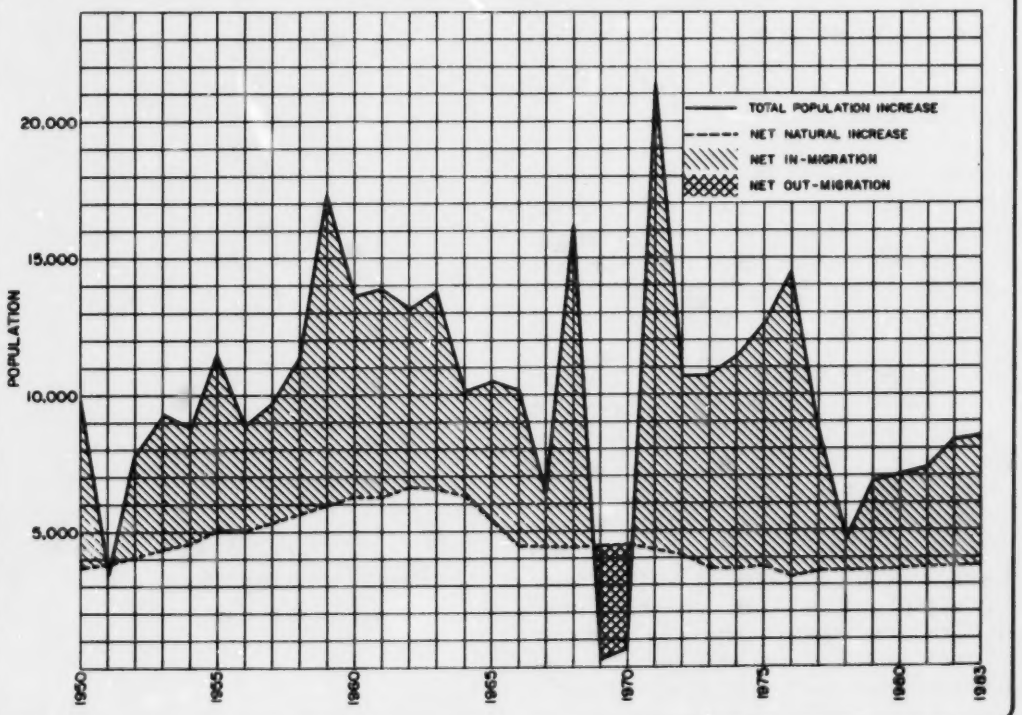
It is our judgement that future employment growth in this Region will depend mostly upon the performance of several sectors: business services, community services, trade, manufacturing (including the "high tech" component) and federal administration.

## Population

Figure 12 illustrates the components of population increase in Ottawa-Carleton 1950-1983. As can be seen, the natural increase component (i.e. the net effect of births minus deaths) has been relatively steady. It reached a peak in the early 1960's, since then has declined, and has leveled out at approximately 3,500 a year.

The trends in natural increase are primarily related to declining fertility. Ottawa-Carleton is currently experiencing a rate of approximately 1.4 births per women

**FIGURE : 12** Components of Population Increase, RMOC 1950-1983



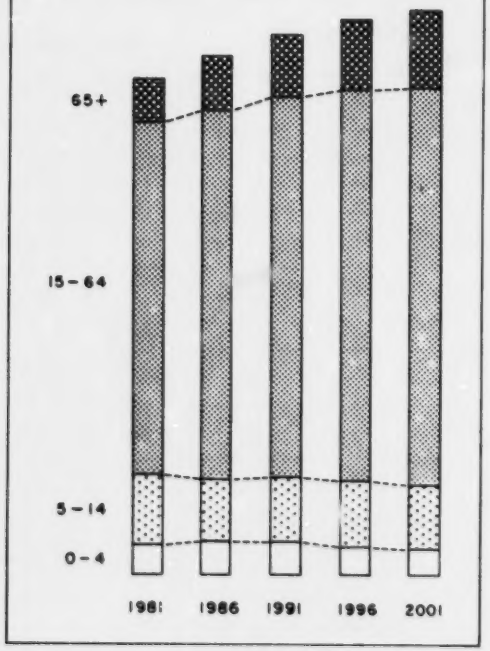
age 15-49 whereas 2.1 births are required for zero population growth (ie. 2.1 is the "replacement rate"). If we relied upon natural increase alone, the Region would experience depopulation as we are operating well below the replacement rate. No significant change is seen in the future.

However, in the next few years the actual numbers of births are expected to increase - but only because of the large numbers of women in the 15-49 age group. The fertility rate itself (number of children per woman) is not expected to change significantly. In other words, more women will be having children but each family will be smaller.

Unless the fertility rate changes, it is anticipated that the actual numbers or births will decline in the 1990's - regardless of whether the "high" or "low" projection is realised.

The large changes in population from year to year are the result of net in-migration to the Region; the level of which has fluctuated significantly. Net in-migration is the balance between those coming to the Region and those who have left. Figure 12 therefore, by concentrating on the net differences, masks the real amount of movement into and out of the Region. For instance, in the period 1971 to 1976, although net in-migration was approximately +29,500, the actual numbers coming into and going out of the Region were + 114,000 and - 84,500!

FIGURE : 13
POPULATION BY AGE GROUPS, 1981 - 2001, LOW PROJECTION



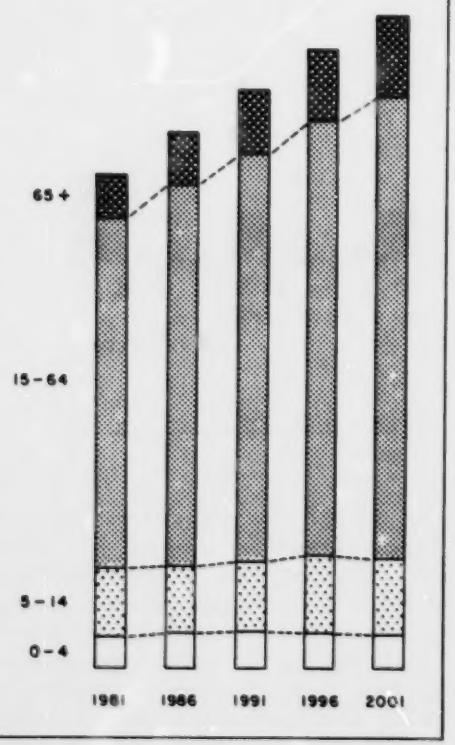

The level of net in-migration is largely determined by levels of job creation in Ottawa-Carleton. The important concept here is that the two aspects - job creation and population growth - are linked.

The employment and population projections prepared by the planning staff have been presented previously at Figure 9.

Regardless of the ultimate population level that is attained, it is important to recognize that the age structure of our population is going to change significantly over time. First, the proportion of population in the working age (15-64 years) will decline slightly, beginning in the early to mid 1990s', although the absolute size of the labour force will grow. There will be a corresponding rise in the "dependency rate" (proportion of total population that are either younger or older than the working age) with a substantial increase in the number of seniors (65+) - nearly doubling by 2001. The school age population (5-15) will decline but the proportion of pre-schoolers (0-4) will remain relatively constant. These shifts in the population structure will have significant impacts on the type and levels of service that will be required of the Region, area municipalities, their boards and commissions and service agencies.

FIGURE : 14

POPULATION BY AGE GROUPS, 1981 - 2001, HIGH PROJECTION




## Households

The rate of household formation has been substantially greater than the rate of population growth. As a direct consequence housing construction has outpaced population growth. This was particularly true in recent years. The reasons for this are complex being related to the age structure of the population, income levels, and lifestyle choices.

With increasing wealth more people can afford to set up and maintain separate households. With increasing numbers of young people leaving home earlier, elderly couples retaining their homes longer when the children leave, and as separations and divorce rates climb, the number of separate households increases. And, as would be expected, the number of persons in each household declines. The result has been that the number of people in each household fell from 3.8 in 1961, to 3.4 in 1971 to 2.7 in 1981. It is anticipated that these trends will continue, although at a slower rate, so that by 2001 household size will have declined further to approximately 2.4.

The impact of declining household size on housing construction (and hence land consumption) is dramatic. For instance approximately 39,000 new urban housing units were required in the period 1971 to 1981 just to accommodate the decline in household size during that period. By comparison, approximate ly 23,000 units were required to accommodate population growth during the same period. Roughly speaking then, two thirds of the urban residential construction which occurred in the past decade was required simply to accomodate the decline in household size (as applied against the 1971 population); one third was required for growth in population.

FIGURE : 15

PROPORTION OF TOTAL HOUSES BUILT BETWEEN 1971 - 1981 REQUIRED TO MEET DECLINE IN HOUSEHOLD SIZE

Looking into the future, the rate of new household formation should stabilize or fall off in the 1990's.

The rate of new household formation will decline if we grow at the "low" projection. The reasons for this are that by the 1990's,

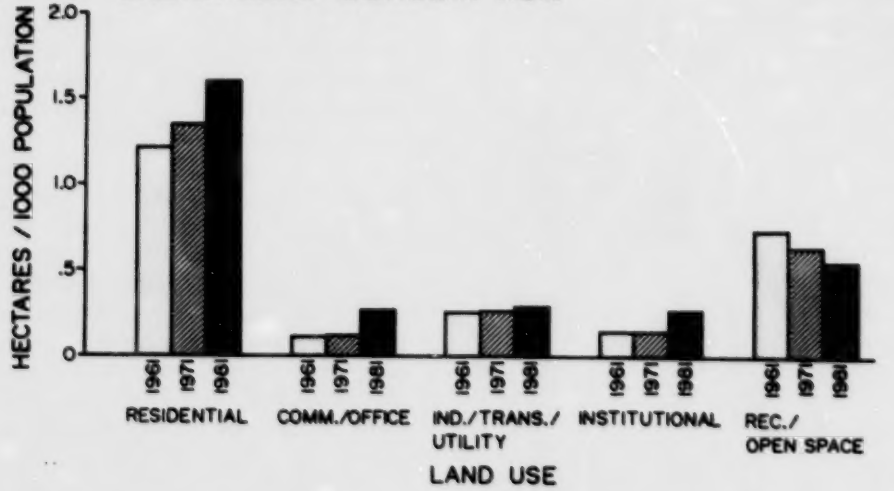
the bulk of the "baby boom" will have established themselves in housing, and the low projection is tied to a low rate of in-migration - the people most likely to form new households. If growth occurs at a rate near the "high" projection, the rate of household formation will remain near current levels reflecting the larger influx of in-migrants to the Region.

As in the past decade, part of the requirement for new houses will be to compensate for a further projected decline in household size. In fact, under the "low" projection approximately 40% of the total requirement in the period 1981 to 2001 results from the projected decline in household size. Under the "high" projection, this proportion falls to approximately 25% (again reflecting the higher influx of in-migrants to the Region).

## Urban Land

One of the significant changes in the 1970's has been the rapid increase in the consumption of urban land from 28 hectares per thousand population increase (1961-71) to 65 hectares per thousand population increase (1971-81). There are many reasons for this.

FIGURE : 16 URBAN LAND CONSUMPTION




With regards to residential land as noted above, household size has declined thus requiring more houses to support a given population. In addition, the housing unit density in many of new subdivisions in suburban areas has been declining. For instance, in the period 1977 to mid 1983 the resubdivision of urban residential lands to permit lower density development resulted in a decline in housing potential of over 2000 units. And, there has also been significantly less redevelopment of inner urban areas to higher densities than was anticipated when the Plan was adopted in 1974.

With regard to non-residential land, since the rate of job creation (and the land requirements of new employment areas,) was faster than the rate of population growth this resulted in an increased per capita consumption of land for employment purposes. In addition, it is suspected that the planning standards for such things as parking and landscaping are higher resulting in a reduction in construction density. It is also possible that an increase in space standards in offices and factories has resulted in more space per employee.

In the period 1971 to 1981 there was also an increase in the amount of land developed for institutional uses - such as the Smyth Road hospital complex, the Queensway Carleton Hospital and Carleton University.

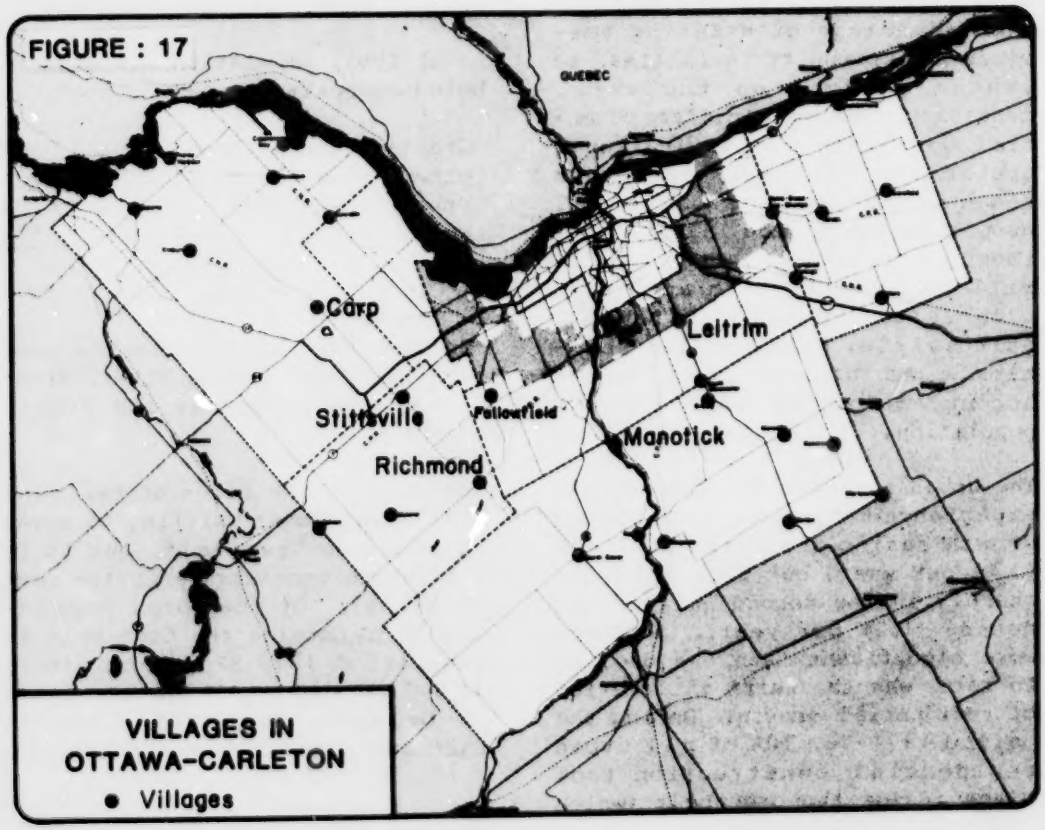
Future urban land requirement is one of the most difficult areas to forecast because it relies on so many assumptions relating to population growth, the number of households and their types, the density of residential construction and its location, the number of jobs and their type and location and density of its development. The forecast also relies on assumptions about the amount of land consumed by institutional users and lands set aside for parks.

However, if current trends were to continue, it is judged that as much as 23,000 hectares of urban land will be required by 2001 assuming that the "high" projection of growth materializes (723,000). Significantly, this is only 1000 hectares less than the amount of land set aside in the 1974 Official Plan which was predicated on a much higher population (1,000,000).

While the trends in the last decade have almost all been in the direction of decreased densities and more suburbanization, it is judged there may be an opportunity in the next decade for this to turn round in some respects. For instance, the transitway system will be in operation which will make certain sites inside the greenbelt attractive for higher density development both for jobs and housing.

## Pattern of Growth

The existing Regional Plan seeks to maintain a continuing balance between growth in the urban areas and growth in the rural communities. In 1971, the rural population was 8.7% of the total Regional population. In the



period 1971-76, rural growth was very rapid (4.5% per year) but this fell off sharply in the second half of the decade (1.2% per year). By 1976 the rural share of total population had climbed to 9.7% where it then held constant to 1981.

Of the growth occurring in the rural areas, the Regional Plan takes the position that half of this should occur in villages to take advantage of existing services and community facilities, to lessen impacts on the rural landscape, and to minimize potential conflicts with agricultural operations. In fact, more than seventy percent of the rural growth in the period 1971 to 1981 took place in villages. Three villages in particular attracted high levels of growth, namely: Stittsville, Richmond and Manotick. As of 1981, villages accounted for 34% of the rural population.

The urban areas of the Region also experienced vigorous population growth during the period 1971-76 (1.8% per year) but this fell off sharply in the second half of the decade (1.2% per year). Perhaps more significant than the decline in rate, was the shift in location of residential growth. During the period 1971-76, 90% of all urban residential construction took place inside the Greenbelt (which accomodated 72% of the population growth). In the period 1976-81, this proportion had declined to 69% - with the three urban communities of Kanata, Orleans and Barrhaven rapidly becoming important foci of new residential development. (In terms of population the three urban communities accomodated all growth in the period 1976-81; while population declined inside the Greenbelt by approximately 8%).

As of 1981, population was distributed approximately as follows:

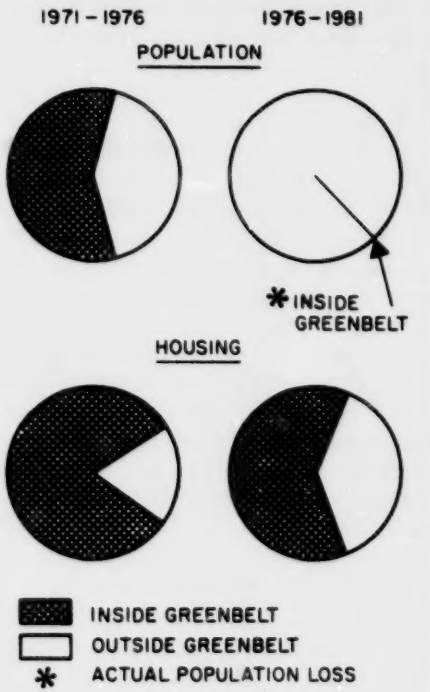
| | |
|---|---|
| Greater Central Area* | 8% |
| Other Areas Inside Greenbelt | 73% |
| Urban Communities | 9% |
| Rural | 10% |
| Total | 100% |

*Greater Central Area is the area bounded by the Ottawa River, Rideau River, the Queensway and Bronson Avenue.

Not only is the focus of residential development shifting to areas outside the Greenbelt, but it is tending to concentrate in the east (Orleans). Of the total population gain outside the Greenbelt in the period 1976-82 (approximately 30,000 persons), 45% located east in Orleans; with 28% south in Barrhaven, and 27% west in Kanata.

**FIGURE : 18**

**LOCATION OF GROWTH**




Based on the declining inventory of vacant residential lands inside the Greenbelt and the relatively modest levels of redevelopment experienced to date, this shift in emphasis to the urban communities is expected to continue - and intensify. Taken as a group, the three urban communities will,

therefore, likely experience higher rates of growth than in the past due not so much to changes in the overall rate of urban growth in the Region but due more to the shift in its locational emphasis. However, the specific location of this growth (i.e. east, south or west) cannot be predicted with certainty since it will be influenced by many factors subject to rapid change (land price, corporate policy of developers, levels of transportation service etc).

Turning our attention away from population growth we have noted that employment growth was very strong in the Region over the past decade. During the period 1971-81, while population grew by 18%, employment opportunities expanded by 33% (this becomes 27% when adjusted to discount the 12,000 federal employees that were relocated to Hull). Unlike population however, there were no dramatic shifts in the location of employment during the decade.

As of 1981, employment was distributed approximately as follows:

| | |
|---|---|
| Greater Central Area | 35% |
| Other Areas Inside Greenbelt | 58% |
| Urban Communities | 3% |
| Rural | 4% |
| Total | 100% |

In summary, over the period 1971-81, the Region witnessed a rapidly expanding employment base with employment growth remaining focussed primarily inside the Greenbelt. During the same period, residential growth slowed but shifted to the urban communities outside the Greenbelt.

The period 1971-81 saw an increase in trip making, and an increase in trip length. Total daily trips (i.e. trips for all purposes) increased from approximately 2.3 per capita in 1971 to 2.5 by 1981. And, it is estimated that the average travel time for the journey to work (average of transit and private vehicle trips) increased from approximately 15 minutes in 1971 to 20 minutes in 1976 and 22 minutes in 1981. Although many of these trips are on transit, the majority are still by car. In 1981, approximately 40% of workers returning home in the evening rush hour took transit.

Perhaps as a result of the increasing number of trips and increases in trip length, demands for increased levels of transit service and roadway improvements are being voiced. At the same time however, since much of that travel occurs <u>through</u> established residential areas (eg. suburban residents on their way to work downtown, Tunney's Pasture, Carleton University, Smyth Road hospital complex) - concerns over community disruption are also being voiced. In the recent past, proposals for new roadways, widenings of existing roadways, and the construction of transitways have all met with stiff community opposition.

Are there solutions? Are there better ways to balance population and employment growth to reduce travel demands? This review of the Plan has provided an opportunity to explore this issue - the results of which are presented below.

## STRATEGIC ISSUES

In an earlier section of this report, we presented the basic development strategy as now set out in the existing Regional Plan (circa 1974). This was followed by a discussion of recent trends in the amount and distribution of population and employment growth in the Region. This puts us in a position to discuss the significance of these trends, in relation to the existing strategy, and to recommend any changes that seem warranted.

But first, we should identify the key issues. Here, we are not thinking so much of the detailed policies in the Plan that might need adjusting (that work will be presented in another report at the second stage of the review process). Rather, we are interested in larger questions, the resolution of which will set the basic strategy that can then serve as a guide for development for the next fifteen or twenty years.

### Rural Growth

For instance, is there any merit in Regional Council taking a stance which would either deliberately encourage or discourage growth in the rural area? On the one hand, rural development offers regional residents an increased choice in residential locations and a larger range of life-styles. It also provides an expanding tax base for rural municipalities. On the other hand, rural growth can also bring pressures for new (and often expensive) services and increased interference with rural economic activities such as agriculture and mineral extraction. And if taken to an extreme, rural growth could dilute the growth potential of the three urban communities - forestalling the date when these could support rapid transit or major commercial and community services.

It should be noted that if the rural area continues to attract 10% of the total regional growth, as set out in the Plan, this will result in a 50% increase in the number of dwelling units located in the rural area by 2001 - under the high growth assumption (i.e. 24,000 units vs. 16,000 units in 1981)!

Further, should Council encourage rural growth to locate in villages (as set out in the existing plan)? Although this approach makes use of existing community services and reduces the pressure for development on other rural lands - there are some problems. First, most villages are located on tracts of good agricultural land and their expansion threatens this resource.

Second, there appears to be problems developing in certain villages (such as Vars and Carp) with respect to private water and sewage systems. The amount of future growth in these villages that could be permitted on the basis of private services may be limited.

Third, as villages expand, those closest to the urban area face the prospect of becoming more urban in character - ultimately resulting in requests for the Region to extend services (such as water, sewer and transit).

For instance, services were extended to the village of Stittsville in 1976. A recent local official plan now provides for an ultimate population of 10,000 people in this location. With regard to its ultimate size, servicing status and proximity to Kanata, Stittsville may become indistinguishable from urban "neighbourhoods" west of the Greenbelt (e.g. Glen Cairn, Hazeldean North). In effect, villages such as Stittsville and Leitrim could

become secondary urban growth centres.

## Urban Growth

The other side of the first issue is the amount of urban growth that is desirable. Tied to this, is the question of the cost of new services (roads, sewer and water) to provide for an expanded population. To get some perspective on this issue, the planning staff collaborated with the staff from the Region's Works and Transportation Departments to estimate the costs of providing infrastructure for different overall levels of growth (the "high" and "low" projections) and different distributions of employment and residential development within the urban area.

But having done so, we realize that the costing of facilities, the ultimate alignment and size of which may not be known for ten or more years, is subject to wide margins of error. Therefore, although these estimates provide important insight into the likely magnitude of costs that will be facing us in the future and the effect of different growth levels and development patterns on those costs, the figures themselves are not intended to be taken literally.

All estimates have been prepared on the basis of constant 1984 dollars and refer to gross costs (i.e. not reduced by various subsides provided by senior levels of government).

### Summary of Costs

Set out below are two tables which summarize the costs for improvements to the Regional sewer, water and transportation systems. Details of the specific infrastructure elements, and their cost estimates, are provided in Appendix 3.

The first summary separates the costs of infrastructure improvements into those needed to serve the expanding requirements of the existing population; the additional costs required to support the "low" population projection; and the additional costs to support the "high" population pro-

**FIGURE : 19**

**CAPITAL COST ESTIMATES* FOR HARD SERVICES TO 2001**
**(in $million, 1984)**

| | To Serve Current Population | Low Projection | High Projection (worst case) |
|---|---|---|---|
| Sewer | ---** | $ 95M | $ 68M |
| Water | $ 3M | $ 26M | $ 56M |
| Transitways | $203M | $ 85M | $ 50M |
| Roads*** | $154M | $204M | $233M |
| Total | $360M | $410M | $407M |
| Urban Population | 495,000 | 563,000 | 653,000 |

*Gross costs (not reduced by senior government subsidies).
**There could be a substantial cost involved in repairing problems in the sewer system inside the Greenbelt but no estimate is available.
***these costs do not include improvements to Provincial or Federal roads.

jection. The second summary distributes the portion of the costs that can be ascribed to various levels of population growth in the West Urban Community (Kanata), the East Urban Community (Orleans), and the South Urban Community (Barrhaven plus expansion).

It must be emphasized that the the apportioning of these costs west, east, and south is also only approximate. The main purpose of these summaries is to point to general conclusions about the relative costs of growth, as related to various population levels, within the four principal urban areas.

**FIGURE : 20**

**Costs of Regional Infrastructure To Urban Subareas At Different Population Levels[1] (in $ million, 1984)**

| | To Get To "LOW" Projection 2001 | | To Get To "HIGH" Projection 2001 (worst case) | |
|---|---|---|---|---|
| | Population (urban) | Cost$M[2] | Population (urban) | Cost$M |
| Inside Greenbelt | 430,000 | 452 | 430,000 | 49[4] |
| Kanata (W.U.C.) | 50,000 | 168[3] | 80,000 | 123[4] |
| Orleans (E.U.C.) | 50,000 | 83[3] | 80,000 | 89[4] |
| Barrhaven (S.U.C.) | 35,000 | 65[3] | 60,000 | 146[4] |
| TOTAL | 565,000 | 768 | 650,000 | 407 |

[1]Excludes costs to Province estimated at $141M for Provincial Highways.
[2]Includes costs to improve existing systems to adequately serve existing population (estimated at $368M).
[3]$39M prorated per increase in population for expansion of Lemieux Island and Green Creek Plants (i.e. $13M to each area).
[4]$50M prorated to total population for secondary treatment at Green Creek Pollution Control Centre (i.e. $29M inside Greenbelt $7M each to Kanata, Orleans, Barrhaven).

For the "high" at 2001, the costs are based on the "worst case" - that is, the distribution of population and employment which creates the largest travel demand (of all options tested). Methods of reducing travel demands and roadway requirements (e.g. through increasing employment outside the Greenbelt) are presented in a subsequent section of this report.

What these summaries indicate is that between now and 2001, the capital costs of improving Regional infrastructure could range between $770M and $1.2 billion (and perhaps more than $1.5 billion if it becomes necessary to make major improvements to the sewer system inside the Greenbelt).

A goodly portion of these costs relate to infrastructure improvements inside the Greenbelt that will be required in the near term regardless of the level of future growth (i.e. to serve the current population level).

Outside the Greenbelt, the cost of providing Regional infrastructure is highest to serve growth in the west, and lowest in the east. The costs of providing infrastructure to serve growth in the south are comparatively small (assuming the

Province builds the 416 freeway - at an estimated cost of $90M) until population levels between 35,000 and 60,000 are contemplated (at which time a transitway and a major road network will be required).

One basic conclusion emerges from the second summary table. Although costs to complete infrastructure in the East and West Urban Communities are high, costs per unit growth decline as higher population levels are reached (i.e. toward 80,000). In contrast, the costs of providing infrastructure in the south are initially low, but then escalate as higher population levels are reached (i.e. toward 60,000).

The costing of growth in the south is quite tentative however. Unlike the West and East Urban Communities, which have been completely planned, the configuration of growth in the south has not been settled (this is a matter which is taken up in a later section of this report).

Having identified the costs of the infrastructure required to upgrade our current situation and then provide for future growth, two questions are raised - can we afford it, and who should pay for it?

With respect to the "affordability" issue, perhaps this is best approached by first putting the costs we have identified (i.e. shown in the previous summaries) in perspective with overall Regional expenditures. In this regard Figure 21 represents diagramatically the total Regional expenditures for the period 1980 to 1983 and the approximate portion of that total which is attributed to expenditures on "capital projects". This Figure is based on net expenditures - that is, the proportion of Regional expenditures which are raised through taxes (as opposed to other sources of revenue like water rates or Provincial subsidies).

**FIGURE : 21**

**NET REGIONAL EXPENDITURES**

Non-capital project items (which make up approximately 80% of the total net Regional expenditures) include such items as social and health services costs and the operating costs of the transit, sewer and water systems.

Capital project expenditures (which make up roughly 20% of the total net Regional expenditures) include sewer, water, road, and transitways projects plus such items as buildings, vehicles, and special studies.

In rough numbers, sewer, water, road and transitway projects have accounted for 75% to 95% of total capital project expenditures in the past few years. It is this portion of net Regional expenditures (i.e. 75 to 95% of 20%) that the infrastructure costs presented in this report relate to.

Perhaps the first observation to make, is that capital projects (i.e. the shaded piece of the pie) have been a relatively small slice of total net Regional expenditures. This is in part due to the way in which these projects are funded. A relatively large proportion of the costs for water, road, and transitway costs are recovered from Provincial grants (e.g. 75% of transitway projects) or other revenue (e.g. expansion to the water system is paid for through water rates). Should

these arrangements change (e.g. through a reduction in Provincial subsidies for road or transitway construction), either more money would need to be raised through taxes or the construction program would need to be pared back.

**FIGURE : 22**

**GROSS CAPITAL EXPENDITURES ON WATER, SEWER, ROADS AND TRANSITWAYS (MILLIONS OF DOLLARS, 1984)**

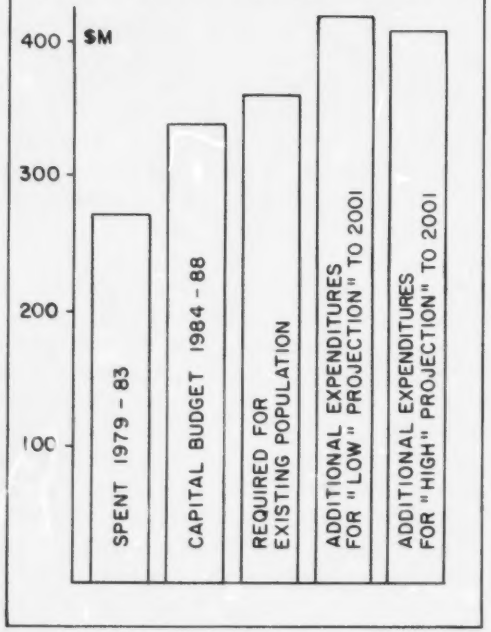



Figure 22 compares the total gross cost (i.e. unreduced by subsidies or other revenues) for water, sewer, road and transitway projects for the past five years and for the next five years as forecast in the budget with the total gross costs presented earlier in this report with respect to: infrastructure required for the existing population; additional infrastructure to provide for low growth; and additional infrastructure to provide for high growth.

What Figure 22 indicates is that although a substantial amount of infrastructure is required to meet "existing" and future requirements, there appears to be scope within the Regional budget to meet these. Although the total costs of future programs (i.e. for low growth and high growth) are higher than those experienced over the past five years, these programs can be spread over a longer time frame, and the costs spread over a larger population. This of course is a highly simplified analysis since it is based on "gross" costs. Much of the infrastructure required in the future consist of water and sewer projects which may not be subsidized by the Province, and the large road program will receive less subsidy than the transitways. However, we see no margin of error, at this time, which upsets the basic conclusion.

The second issue related to costs is who should pay the costs and how these costs can be distributed equitably. In this vein, most often "growth" is viewed as the result of external influences - for instance the influx of new people into the region. But is it that simple?

Take the hypothetical example of two young couples - one couple that currently lives in Westboro in Ottawa; the other lives in Kitchener, Ontario. Further, assume that the Westboro couple decides to buy a new house in Orleans (to provide space for a baby that recently arrived) on the strength of a new teaching job that became available in Gloucester. Further, for this example, imagine that the Westboro couple sells their house to the Kitchener couple. The Kitchener couple wants to move to the region as a result of a new "high tech" job that became available - in Nepean. And finally, assume that the new house in Orleans is located in a large subdivision - the approval of which required the extension of regional water and sewer pipes - and brought closer the date at which new roads or a transitway might be needed.

Which of these highly interrelated events constitutes "growth"? Was it the new "high tech" job in

Nepean that attracted the Kitchener couple? The move by the Kitchener couple does not by itself appear to contribute to growth since they bought an existing house which didn't require any new services.

Was it the better teaching job in Gloucester that enabled the Westboro couple to move to a bigger house in Orleans that created the "growth" and consequent demand for new services? Or do we blame the baby?

In our view, the urban areas of the region comprise an expanding and highly interrelated system of housing and employment opportunities. The movement of people to and from these opportunities is quite fluid; and we can all benefit from this fluidity. For instance, we may wish to take up a new job in one of the urban communities outside the Greenbelt but live in Centre Town. On the hand, we may want just the reverse. Either way we all benefit from having an urban system with many options open to us, and with appropriate linkages (e.g. roads or transitways) to provide convenient access to these.

Our basic conclusion is that the notion of growth being a result of "new" people coming to the region is quite inaccurate. Rather, growth represents the expanding range of employment, housing, shopping and leisure opportunities that becomes available throughout the urban system as a result of the expansion of collective needs. A concrete example was provided earlier when we observed that two thirds of the new houses constructed in the period 1971-81 were required to meet the declining household size within the housing stock as it existed in 1971. Only one third of the new houses were required to house the expanding population. Similarly, in the future a proportion of new housing units will be required to meet the needs of the existing population

The task at hand then is to prepare a plan to guide the development of the urban system so that it grows in a manner that continues to provide expanding opportunities to all regional residents; both present and future.

## Additional Urban Land

As mentioned earlier in this report, the process of urbanization in Ottawa-Carleton is consuming land at an accelerating pace. In the period 1961-1971, 28 hectares were urbanized for every 1000 increase in population. This rate more than doubled to 65 hectares per 1000 population growth in the ensuing decade. More than half of this land consumption was related to residential development; two thirds of which was a direct result of declining household size within the existing housing stock.

In short, we all spread out with fewer people in more housing units. To illustrate, if there had been no population increases in the period 1971-1981, approximately 39,000 units would have been required simply to meet the expanding needs of the 1971 population. And at the average construction density that has prevailed over the past decade, this process alone consumed approximately 1350 hectares of land. By comparison, this is more than all the developed residential land in the City of Gloucester.

As a further illustration, in the period 1971 to 1976, 28,000 housing units were built inside the Greenbelt while population increased by only 28,500 people. In the period 1976-1981, an additional 16,600 unnits were built inside the Greenbelt while population there declined by 2,000!

To provide for future urban development the 1974 Plan designates lands inside the Greenbelt, in the West Urban Community (Kanata), the East Urban Community (Orleans) and the first phase of the South Urban Community (Barrhaven). These are our so-called "first stage" lands.

Additional lands in an expanded South Urban Community are to be brought on stream at a later date.

The Plan assumes that the first stage lands could accomodate approximately 750,000 to 820,000 people. However, based on a continuation of current trends in household size and development density, it is now judged that these same lands may only accomodate approximately 650,000 people. In other words, if the current rate of land consumption continues we are going to need additional residential lands (i.e. "second stage" lands) at a much lower population threshold than originally anticipated.

Our most recent published estimate (Dec. 1982)* of the remaining vacant residential lands is given below:

| Vacant Urban Residential Lands (Dec. 1982)* | |
|---|---|
| Inside the Greenbelt | 575 ha |
| West Urban Community | 1420 ha |
| East Urban Community | 1105 ha |
| Barrhaven | 230 ha |
| Total | 3330 ha |

*currently being updated

In the past few years, we have witnessed residential land consumption ranging from 75 hectares to 205 hectares per year. Based on an analysis of future household demand, likely housing mix, construction densities and redevelopment potential, a projection of future residential land requirements was made. This projection indicates a similar range of 70 to 210 hectares per year into the future (see details at Appendix 4). This forces the conclusion that our "first stage" residential lands will be exhausted anywhere between 15 and 45 years from now. Of course, new lands will need to be brought on stream well before we run out - if an orderly land market is to prevail and housing prices are to remain stable.

The wide range in our projection results from the widely varing assumptions that need to be considered. Are we going to grow at the "low" end of our population projections - or nearer the "high"? Are we going to continue to build low density housing forms (approximately 60% of the 6800 housing completions in 1983 were single detached homes) or will there be a significant return to the construction of high rise apartments (such as the 30,000 apartment units constructed in the period 1971 to 1975)? Will we get more redevelopment of older urban areas to higher densities or will community groups continue to resist this? Definitive answers to these questions are not available.

But we know that the propensity to form households (a statistical measure of the likelihood of any individual to maintain separate living quarters) has continuously climbed - for all age groups - even during the recent recession. The number of single and two person households is rising rapidly, young people are establishing separate housholds sooner, the elderly are staying in their homes longer (the so-called "empty nesters") and the rate of divorces and separations is still rising. All of these indicate a continuation of the current trend to small household sizes.

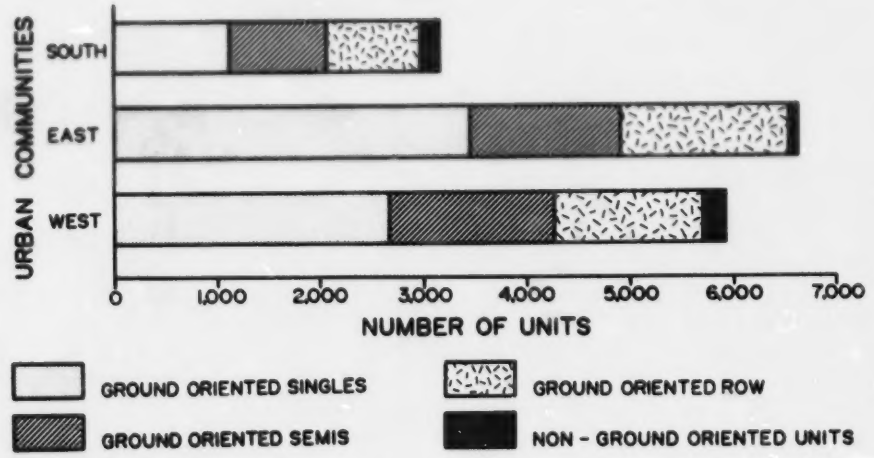
We also know that established community groups are most relunctant to see their neighbourhoods developed (or redeveloped) to higher densities, and that recently, in our new suburban communities, we have been faced with down zonings and resubdivisions to lower densities. This indicates a likely continuation of the current trend to low density residential construction.

Regardless of the population growth rate ("low" of "high") it appears that there is going to be a strong demand for land unless

the trend to lower densities turns around. A recent review of this issue by the planning staff concluded that this is most unlikely.

creasing densities overall. Further, the amount of "redevelopment" that results in a net increase of units has been quite small to date.

FIGURE : 23 HOUSING MIX IN NEW URBAN COMMUNITIES

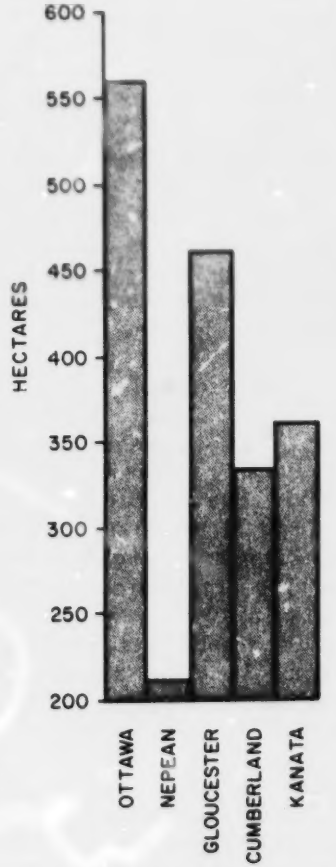



The two large urban communities (Kanata and Orleans) are being planned at low densities (approximately 20 units per residential hectare). Further, the opportunities for "infilling" (development of small bits of vacant land within existing neighbourhoods) or "conversions" (splitting of large houses into multiple units) are limited and not likely to make substantial contributions to in-

The one option that holds some promise (not yet confirmed) is for the redevelopment of lands around selected stations along the new transitways. It is possible that such redevelopment could include a component of high density residential, along with a mix of office and commercial development. This could reduce residential land consumption to a degree.

FIGURE : 24

VACANT INDUSTRIAL LAND*, URBAN AREAS, 1983




* ALL FIGURES ARE NET-EXCLUDES INTERNAL ROADS (EXISTING FUTURE)

Similar to the trends in residential lands our rate of land consumption relating to employment uses has also been increasing. As a result of increases in the labour force, increased parking and landscape requirements and (perhaps) higher space allocations per employee, the consumption of land related to employment climbed from 5 ha per 1000 population increase in the period 1961 to 1971 to 8 ha per 1000 population increase a decade later. There may be slightly less land consumed in the future since some firms can expand on the lands they purchased in the past decade.

Unlike residential lands, industrial lands are in abundant supply. It is anticipated that land requirements for future industrial development will be in the range of 14 to 33 ha per year. Even using the "high" employment projection the Region has, approximately, a 40 year supply of serviced (or readily servicible) industrial land and another twenty years of unserviced land in reserve.

Although we have plenty of industrial land, one addition that can be justified is to bring on industrial lands south of the Greenbelt when the South Urban Community is expanded so this community can develop a strong employment base.

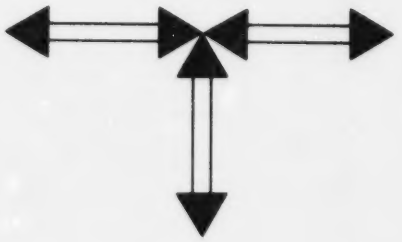
## Location of Future Growth

In the previous section of this report it was established that "first stage" residential lands could be exhausted as early as 2001 depending on growth rates and development densities. If growth occurs at the "high" end of our projection, planning for additional land will need to start well in advance of 2001; perhaps as early as 1985.

As we cannot create more land inside the Greenbelt, these additional lands will need to be found outside - and here we have several choices. We could expand the East or West Urban Community beyond their current planning boundaries, expand the South Urban Community, out from Barrhaven, or find an altogether new location for growth. The second choice (expansion in the south), is the stance taken in the 1974 Plan - the so-called "second stage" lands.

The analysis of the future requirements of the transportation system undertaken jointly by the Planning and Transportation Departments indicates that benefit may be achieved by locating growth in the south. A large South Urban Community would act as a counterbalance to the East and West Urban Communities. At the present time, the rapid growth in the East (and to a lesser extent in the West) is creating a requirement for new roads. Travel is highly east-west oriented as commuters travel from the two urban communities (Kanata and Orleans) to work locations inside the Greenbelt.

**FIGURE : 25**



If a substantial portion of future growth could be directed south of the Greenbelt, more north-south travel would result, relieving some of the pressure in the east-west direction. In this context, the benefit of directing growth south applies at all population levels (i.e. we have traffic problems in the east-west axis now).

The reverse of this conclusion is that expansion of the East and West Urban Communities would increase east-west travel, and

heighten the demands for new (or improved) roadways to the core area. Directing growth south of the Greenbelt is not without its share of problems however.

From a purely cost perspective (i.e. the capital costs of Regional infrastructure), an earlier section of this report has indicated that the unit cost of providing for growth in the south is relatively small to a level of about 35,000. The lower cost of servicing the south rests however on the assumption that the Province will build the 416 freeway which will become the major north-south urban freeway serving growth south of the Greenbelt (west of the Rideau River). Costs begin to escalate however as population levels climb towards 60,000.

Then, there is the problem of establishing the 416 freeway. Our analyses indicate that a major north-south road will be required to support a growth centre south of the Greenbelt, (i.e. similar to the Queensways function in relation to Kanata and Orleans). In this regard, there has been significant opposition to the construction of the 416 freeway by community groups and political representatives in Nepean, and the Province has not yet committed the funds.

In addition, because 416 will terminate at the Queensway near Bayshore, there is concern by community groups in west Ottawa that this will simply add more traffic to the Queensway, which combined with traffic from Kanata, could trigger the need for an additional east-west road - such as the Britannia Arterial or the Hunt Club extension to Knoxdale. If we experience large population growth, but low employment growth in both these locations, the need for new east-west roads may indeed materialize as an issue. What comes from this is that in evaluating the potential transportation impact of the South Urban Community, consideration has to be given to the combined travel demands in the Queensway corridor of the South and West Urban Communities.

Second, there is the problem of resolving what the best configuration for the South Urban Community should be. The existing Regional Plan conceptually shows a future South Urban Community on both sides of the Rideau River (in Nepean and Gloucester) and on both sides of the Jock River (in Nepean). Apart from the additional costs associated with getting infrastructure accross these rivers (sewers, water, bridges) there is a question of whether an integrated community can be arranged around these physical obstructions. For instance, is it practical for the town centre to straddle the Rideau River (i.e. half in each municipality)? If not, will facilities need to be duplicated on both sides of the river? Will additional bridges be required to accomodate travel between the two centres?

Third, there is the loss of good agricultural land that will result from the urbanization of these lands.

Would it be better to split the South Urban Community into two distinct pieces - one being in Nepean and one being in Gloucester? By this process could growth be located away from the Rideau River to take better advantage of the 416 facility in Nepean and the 417 in Gloucester? If we split the south into two smaller communities, would we ever achieve viable town centres, high levels of employment and a full range of commercial and community services? Could we service both with transitways? Would splitting the South Urban Community create sufficient travel demands in the Bank Street corridor to require the building of new road facilities such as the Alta Vista parkway?

The basic conclusion we have reached is that although there appear to be certain benefits from directing growth south of the Greenbelt, there are still many questions to be answered with respect to the size, configuration and timing of this growth.

These questions can be better answered through a more thorough analysis of development options for all lands south of the Greenbelt - a planning exercise which can be undertaken jointly with the Cities of Gloucester and Nepean. This will provide a better appreciation of actual Regional costs and how these could be scheduled within the total program of capital projects.

Since it was previously shown that at the "high" growth rate the need for "second stage" lands is not many years away, planning for the south should begin shortly.

## Employment Distribution and Transportation

Part of the technical work that has gone into the Official Plan Review was a joint exercise of the staffs from the Planning and Transportation Departments. This exercise involved, in part, the use of a computer model, the results of which are summarized in Appendix 5. The purpose of this work was to determine the effects on roadway requirements of locating more or less jobs and people in various parts of the region. Basically, three geographic areas were considered: lands outside the Greenbelt (in the three urban communities); lands in the central area; and lands inside the Greenbelt but outside the central area.

Some of the general conclusions from that work were presented earlier in this report in terms of the relative costs of providing roads and transitways at different levels of growth. But there are several specific issues that might benefit from a more detailed discussion.

First, the ultimate distribution of employment amongst the three sub-areas will have a significant effect on future roadway requirements. Our work has shown clear benefits from diverting new employment growth to the urban communities outside the Greenbelt. This would serve to reduce travel in general (some of the residents of these communities can work close to home) and encourage a more balanced two-way flow of traffic into and out of these communities during the "rush hour". So, although there will still be a "rush hour", we will not all be rushing in the same direction. This has the advantage of reducing the number of lanes that would be required on any particular facility.

As activity levels (i.e. the ratio of the number of jobs to the number of residents) increase, in the urban communities outside the Greenbelt, the number of lanes required to connect these communities to employment centres inside the Greenbelt decreases. Examples of the effect of achieving high levels of employment on roadway requirements are provided in Appendix 5.

Second, there is a limit to the amount of employment that can locate in the central area - based on the capacity of the existing road network. The 1974 Plan indicates that the limit is in the order of 100,000 jobs. The tests run by the Transportation Department included various levels of jobs in the central area up to 110,000. These tests confirm that we would begin to experience capacity problems at about the 100,000 level.

A third issue that was explored was the benefit of increased "modal split" (the proportion of people using transit rather than private vehicles) on roadway re-

quirements. The 1974 Plan set modal split guidelines for various travel corridors. For example, the Plan guideline for travel to the East Urban Community through the Greenbelt was 20%. In fact, in the period 1971 to 1981 the actual transit usage increased from 2% to 27%. It is the judgement of the Transportation Department that there is the possibility of increasing this even further to perhaps 40% in the future. Such an increase would have the effects of reducing additional road requirements. Examples of the effect of achieving a higher modal split are given in Appendix 5.

A final issue is the relationship of the transitways to employment around the transitway stations. From the analyses it appears that concentrations of high employment (and large numbers of residential units) at selected locations along the transitways - such as the "town centres" in the urban communities, the central area, and a few locations such as the station at Woodroffe and Baseline Roads (in Nepean) would be beneficial. These activity nodes and the transitways would complement each other. The high levels of activity would encourage use of the transit system, and proximity to the transit system would offer high levels of service to the employees and residents at these nodes. This may also support better off-peak transit service, and offer operational savings by increasing the number of fare paying passengers in both directions.

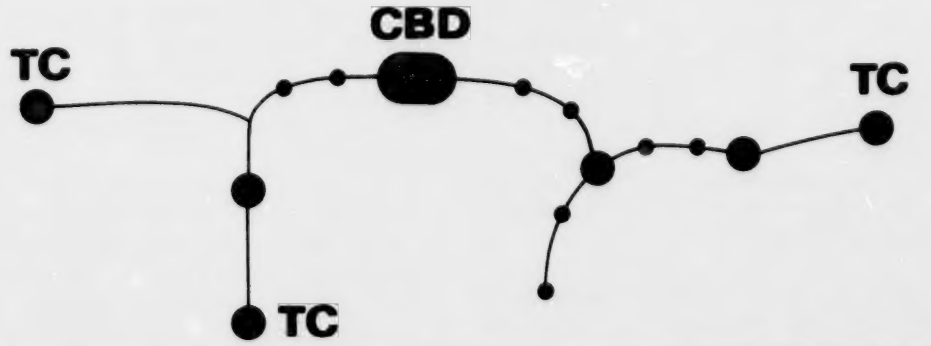
Not all stations have great potential for the development of major activity nodes - but the transit way system would benefit from being "anchored", at the ends, the centre, and a few places in between.

Concentration of employment and residential uses along the transitway would also have the beneficial effect of increasing density thereby reducing land consumption and the requirements for other infrastructure (sewer and water) in other parts of the region.

The question raised by these conclusions is whether the Region should view the transitways as a "development tool" - that is, as a mechanism for influencing the distribution of employment and residential growth throughout the urban area. There appear to be distinct benefits from doing so.

FIGURE : 26

ACTIVITY NODES ON TRANSITWAY



## Urban Communities

When the 1974 Region Plan was drafted, a conscious decision was made to direct new urban growth to specific locations outside the Greenbelt: the West Urban Community (Kanata), the East Urban Community (Orleans) and the South Urban Community (Barrhaven being the first phase). The basic intent was to see a small number of new communities established so that these few would develop to a sufficient size (75,000 to 100,000) so as to support a full range of community facilities and attract employment (thereby reducing travel demands and requirements for new roadways to take commuters through established neighbourhoods to employment centres inside the Greenbelt). This would also minimize the number of locations (and therefore the cost) of providing infrastructure (roads, transitways, sewer and water pipes).

Two key elements of the current Plan's objectives for these new communities is the attraction of substantial employment and the development of strong "town centres" having a mix of shopping facilities, community services and office employment.

As part of this Review, tests were made of the impacts of various levels of population and employment in these communities on the road network leading through established urban areas inside the Greenbelt. These tests confirmed the benefits to be gained if substantial employment can be attracted to these communities (i.e. a reduction of road requirements since fewer people will need to commute from the community to employment centres inside the Greenbelt).

The tests also indicate a substantial benefit from extending rapid transit to these communities to encourage higher transit ridership (which again reduces roadway requirements). However, to be most effective there should be a significant concentration of commercial, retail and residential development in the town centre where the rapid transit system would terminate. In short, rapid transit and strong town centres reinforce each other.

Having confirmed the benefits to be gained from achieving high levels of employment and strong town centres - the question is, can these be realistically achieved?

In 1981 only 3% of total employment was located in the three urban communities, 75% of which was concentrated in Kanata. This represents an activity rate of only 6% in the south (Barrhaven), 10% in the east (Orleans) and 39% in the west (Kanata). [Activity rate is the ratio of jobs to population. For example, an activity rate of 25% means there is one job for every four residents of the community.]

The existing Regional Plan sets a minimum activity rate guideline of 35% for these communities when they reach full development (i.e. population of 75,000 to 100,000). Activity rates for urban communities in the Regions of Durham and York (populations of 20,000 to 120,000) <u>average</u> roughly 35% in Durham (Ajax, Newcastle, Oshawa, Pickering and Whitby) and 50% in York (Markham, Vaughan, Richmond Hill, Aurora, New Market).

If, for sake of argument, we accept an activity rate of 35% as a minimum acceptable guideline for our urban communities then the number of jobs required at various population levels would be as set out in below. Figure 27 also indicates the 1981 situation for jobs and population in the West, South, and East Urban Communities:

**FIGURE : 27**

| | POPULATION | JOBS | ACTIVITY RATE |
|---|---|---|---|
| W.U.C. 1981 | 18,500 | 7,200 | 39 |
| E.U.C. 1981 | 23,300 | 2,300 | 10 |
| S.U.C. 1981 | 8,700 | 500 | 6 |
| ---- | 20,000 | 7,000 | 35 |
| ---- | 50,000 | 17,500 | 35 |
| ---- | 80,000 | 28,000 | 35 |
| ---- | 100,000 | 35,000 | 35 |

The level of job provision indicated above is quite substantial. Even Kanata (often cited as a stellar "high-tech" performer) will need to more than double its current level of jobs by the time it reaches 50,000 population, if the guideline is to be maintained. This is equivalent to approximately five more "Mitels". The East and South Urban Communities will have to perform even better to catch up.

There are several conclusions falling out of this. First, there are clear benefits to achieving high activity levels in the urban communities. This strategy will reduce the cost and disruption of providing new or widened roads to carry commuters to employment centres inside the Greenbelt-many of these roads passing through established urban neighbourhoods.

Second, is the conclusion that it may prove difficult to achieve high activity levels unless effective measures can be taken to direct new employment to these communities. The development of such policies is probably beyond the scope of an Official Plan and will require the active participation (and co-operation) of agencies such as the Commercial and Industrial Development Corporation, area municipalities and private developers.

Third, attention must also be given to the type and location of employment in the urban communities. The best strategy to support rapid transit is to concentrate employment in the town centres as much as possible. To this end, the attraction of office development would be most beneficial (and by the same token it might be difficult to attract employment to the town centres until the transitways have been extended).

If high employment levels, a strong town centre, and rapid transit can be achieved, the strategy of fostering a few large urban communities outside the Greenbelt will pay dividends. If it fails, the Region will simply end up with large suburban developments separated from employment centres inside the Greenbelt - for which a premium will be paid in terms of longer commuting distances, more roadway construction and more traffic through neighbourhoods inside the Greenbelt.

## OPTIONS - DIRECTIONS FOR FUTURE GROWTH

### The Long Range View

Earlier sections of this report have raised questions relating to different aspects of growth; its rate, distribution and associated infrastructure costs; when additional urban lands might be required; its amount, and possible locations; the effects of transit levels and employment distributions on roadway requirements; the importance of high employment levels and successful town centres in the urban communities; and the benefits of concentrating high levels of employment and residential activity in selected nodes along the transitways. It is our judgement that these are strategic issues that need to be addressed before new Regional Plan policies can be prepared.

But how do all these elements fit together? Do they add up by themselves to produce a consistent strategy - or do several elements work at cross purposes?

This final section of the report attempts to evaluate the combined effects of all these elements to arrive at a definite conclusion about a long term strategy for development of this Region. That is, we hope to produce a rough sketch of what we should aim for - in the long term. [The logical steps to achieving the long term strategy, when and as approved, will form part of the second stage in the Official Plan Review process].

Our evaluation of the various elements of the strategy is based on many judgements, tempered by analyses of our research findings. But no rigorous mathematical evaluation technique is applied. We could discover very few evaluation criteria, apart from costs of hard services, that lend themselves to reliable statistical analysis. For instance, there is no reliable way to determine the relative disruption that would be felt by various communities caused by road widenings or the construction of new roads - especially when the details of property requirements or alignments are not known.

What we can say, with little fear of contradiction, is that having less road widening or less road construction is better than having more. And, it is our judgement, that this holds true for proposals to increase housing densities within existing communities. In terms of disruption felt by the community there would probably be general agreement that having less change in the direction of high density is better than more.

The following evaluation, therefore, is based on the general premise that disruption to existing communities (through increased traffic, roadway construction and high density development) is "bad", and reducing the combined costs of providing Regional infrastructure to support growth (such as roads, water and sewer) is "good". We could find no other criteria that were particularly useful to our evaluation.

The first issue to clear away is the question of an "appropriate" overall rate of growth. In terms of hard costs it appears that per unit costs decline with successively higher levels of population - at least up to the limit we tested (approximately 800,000 in the urban areas).

This finding appears to be related to the fact that we have been operating at or near the threshold capacity of some major facilities and that expansion to these facilities is required to meet the

needs of the existing population. As a result, the requirement for expansion of these facilities occurs very early in the planning period (such as expansion to the Green Creek Pollution Control Centre and addition of secondary treatment; the phasing out of the Watts Creek Sewage Treatment Plant through progressive extension of the Lynwood Collector, plus a substantial program of road improvements and transitway development).

Tied to this is the nature of many of these facilities. They are not easily expanded in small increments. For instance, when a new collector sewer pipe is installed, considerable extra capacity is provided since it is far cheaper to build one big pipe than to build a small one and have to come back and twin it later.

As it turns out then, in terms of the costs of hard services, there is no "strategic" value in controlling growth rates within the "low- high" range we have tested (even if we could figure out how to do it).

Even if we grow at a rate approaching the "low" projection, our analyses suggest that expansion to many facilities will be required. In fact, the majority of costs for new infrastructure that is now required (for the existing population) and will be required into the future will appear early in the planning period regardless of growth rate. But once we get over the initial "hump" we start to coast downhill; and per unit costs decline.

Further, a good portion of these costs can not be avoided even at "zero" population growth. Under zero population growth there will still be a need for more housing and more jobs, producing more travel and road requirements - simply as a result of the expanding requirements of the existing population.

For instance, the projected decline in household size from 2.7 in 1981 to 2.45 in 2001 would require the construction of approximately 21,000 new units just to meet the expanded needs of the 1981 population. For comparison, this is more than two and a half times the total housing stock in the East Urban Community (in 1982).

The bottom line is that zero population growth does not translate into zero costs for new infrastructure.

With respect to "community disruption", it is difficult to escape the conclusion that growth, at whatever level, will introduce change in the urban system. Regardless of the level of growth, or how jobs and population are distributed, there will be more travel generated. This inevitably creates a need for more road capacity.

As presented in the discussion of costs, the bulk of improvements to the transportation network (road widenings, transitway construction) occurs early in the planning period.

Alternative distributions of growth (jobs and people) can influence the amount of new road requirement, as can the level of transit usage, but there is no distribution that results in zero road requirements. In fact, the sort of redistribution of people and jobs that result in smaller road requirements may have the side effect of requiring intensification of activity inside the Greenbelt.

In short, we could trade off fewer roads for more density in each neighbourhood; but either way disruption will occur. As presented earlier, even zero "population" growth does not translate into zero disruption since there will be growth in houses, jobs, and travel - to meet the expanding requirements of the existing population.

In summary, it would appear, on

the face of it, that much of the cost of infrastructure and the community disruption that goes with it will appear early in the planning period - regardless of the growth rate. This would indicate that growth rate, by itself, is not of strategic significance within the planning period.

What does appear to be of strategic significance is the distribution of employment as it relates to additional transportation requirements in the mid-term and long range picture (1990's to 2001).

As presented earlier in the report there are benefits to be gained by locating high levels of employment in the urban communities, to locate growth south of the Greenbelt, and to increase transit usage in the east, west and south travel corridors. Each of these measures will significantly decrease the requirement for additional road capacity - especially in the east-west travel corridors. The benefits derived from these measures include a reduction in the cost of building additional road capacity and a reduction in the community disruption associated with road projects (new facilities and widenings).

There are also advantages to locating high levels of employment and residential development at a few activity nodes along the transitways - if these developments can be largely "transit oriented" (i.e. there may be a need for policies to discourage employees from arriving by car - such as parking restrictions). These nodes include the central area (which already has high employment levels and parking restrictions), the town centres outside the Greenbelt, and a few other selected stations.

The benefits of this measure include a reduction in car-oriented travel (and the costs and disruption of additional roadways), and the intensification of land use which will result in lower land consumption (and infrastrucure) elsewhere. However, depending on the location, there may be considerable community disruption associated with developing (or redeveloping) the lands around the nodes so this will have to be approached carefully.

In this regard, employment growth in the central area should remain limited to the capacity of the transportation network. In fact, this may be a suitable principle for guiding development at any of the nodes inside the Greenbelt which are selected for substantial development.

With regard to future urban land requirements the need to begin planning for "second stage" lands is not a long way off. And, there appears to be benefits to directing growth south of the Greenbelt, in preferance to expanding the boundaries of either the East or West Urban Communities.

But there are some questions to be answered about the configuration of the South Urban Community, questions which are best resolved through a subsequent thorough analysis of growth potential for all lands south of the Greenbelt.

And finally with respect to growth in the rural area the basic issue does not appear to be that growth should be regulated at a particular level. What is important, is that ex-urbanite growth not be allowed to interfere with rural economic activities such as farming and mineral extraction, or result in demands for further extension of urban services. There does appear to be a need for the development of growth policies relating to those villages which, because of their proximity to the urban area, servicing status, or transportation linkages, may become "urban-like" towns. The rapid growth of such towns (eg Stittsville, Leitrim, Manotick, Carp) could dilute growth in the urban communities, thereby forestalling the date wnen these could support rapid transit or

major commercial and community services. Without some control, we could, in fact, end up with a large number of small secondary urban-like growth areas, rather than three large vibrant urban communities.

## SUMMARY – Regional Development Strategy

The Official Plan Review has discovered no basic fault with the development strategy set out in the existing Regional Plan.

Growth can be permitted in the rural area providing that firm policies are established to protect the resource base (agriculture and mineral extraction) and to safeguard the environment.

While further extension of piped services to rural villages may be required to solve sanitation problems, village growth should not be permitted which might unduly encroach on agricultural lands or result in the creation of secondary "urban" growth centres.

Future urban growth outside the Greenbelt should be confined to the East and West Urban Communities until the issue of the best configuration for growth south of the Greenbelt is resolved.

The overall rate of urban growth does not appear to be of strategic importance. A fairly large program of infrastructure improvements is required to meet existing requirements and to provide for growth. However, the level of costs associated with this program is not extraordinary in comparison to the past five year's expenditures nor the five year budget forecast.

As the requirement for additional residential land could emerge fairly early in the planning period, planning for urban growth south of the Greenbelt should begin in the near future. This planning, which should look at all lands south of the Greenbelt, is best approached through a joint planning exercise with the Cities of Nepean and Gloucester.

Measures should be undertaken to reduce the requirements for new or expanded roadways inside the Greenbelt. These measures will include improving the public transit system on a priority basis and increasing employment growth in the urban communities.

High levels of employment and residential development should be located in selected "activity nodes" along the transitways. These nodes would include the central area, the town centres of the urban communities, and a few additional locations inside the Greenbelt. Future development in these locations should be largely "transit oriented" and scaled to fit with the existing capacity of the road network.

# appendices

Appendix 1

**OFFICIAL PLAN REVIEW:**
**LIST OF TECHNICAL REPORTS**

1) Mobility in Ottawa-Carleton; August 1980

2) 1980 Vacant Residential Land Study; September 1980

3) Population Forecasts Ottawa-Carleton, 1976-2001; October 1980

4) Urban Residential Land Staging Report; May 1981

5) Households In Ottawa-Carleton, Trends and Forecasts; December 1982

6) Employment in Ottawa-Carleton, 1976-1981; February 1982

7) Population Trends in Ottawa-Carleton, 1976-1981; April 1982

8) Land Use in Ottawa-Carleton; August 1982

9) Official Plan Review: Employment Projections, Ottawa-Carleton, 1981-2001; April 1983

10) Official Plan Review: Population Projections, Ottawa-Carleton, 1981-2001; April 1983

11) Official Plan Review: Options for Future Growth, Ottawa-Carleton, 1981-2001; April 1983

12) Official Plan Review: Ottawa-Carleton Planning Policy in Review; May 1983

13) Land and Infrastructure Mapping Program, Ottawa-Carleton, Update December, 1982; Canada Mortgage and Housing Corporation and Regional Municipality of Ottawa-Carleton; 1983

14) Transportation Component of the Official Plan Review Regional Development Strategy Transportation Department; February 1984

Appendix 2

## PROSPECTS FOR GROWTH IN OTTAWA-CARLETON

### OTTAWA-CARLETON POPULATION GROWTH 1971-1981

In the period 1971 to 1981 the population of Ottawa-Carleton grew from approximately 472,000 to nearly 547,000 or an increase of some 75,000 persons. This population growth translates into an increase of approximately 7,500 persons per year on average or a compound growth rate of approximately 1.5 per cent. The long-term planning strategy of the Official Plan of the Regional Municipality of Ottawa-Carleton is based on the assumption that the population of Ottawa-Carleton could increase to one million persons in approximately 30 years from the date of its adoption (1974). This assumption was predicated on a continuation of the population growth rate experienced in the 1961 to 1971 period. During this period Ottawa-Carleton grew by nearly 114,000 persons. The average annual population growth was approximately 11,350 persons while the compound growth rate was 2.8 per cent per annum.

The impact of the difference in growth levels and rates observed between the 1961-1971 and 1971-1981 period is obscured by the significantly lower growth rates of the last five years. In the period 1976-1981 Ottawa-Carleton grew by approximately 5,300 persons on average per year or a compound growth rate of approximately 1.0 per cent. This rate and level of growth was lower than during any of the previous 5 year periods since 1951.

### COMPONENTS OF POPULATION GROWTH IN OTTAWA-CARLETON 1961-1981

What are the factors which have resulted in the decline in the rate and level of population growth in Ottawa-Carleton? The change in population in any given period is a function of births, deaths and net-migration the latter being the difference between in and out migration. An analysis of these variables indicated that declining fertility levels and lower net-migration levels were the principle causes of the decline in the level of growth. The mortality rate, in contrast, decreased slightly.

It is evident however from studies undertaken by the Planning Department that the major demographic factor influencing the level of population growth is the amount of net in-migration. Migration is mainly influenced by the rate of job formation. Other influences such as socio-cultural and political factors are also a consideration but not the same extent as the growth in employment.

The rate of job creation was and is one of the most important factors determining the rate of population growth in Ottawa-Carleton.

### POPULATION GROWTH AND DISTRIBUTION 1971-1981

Though the population growth levels and rates experienced in the 1971 to 1981 period are significantly lower than the previous decade (the experience of which formed the basis for the Regional Official Plan) the geographic distribution of this growth is also significant and is one of the main reasons why a review of the Official Plan is required.

In the decade 1971 to 1981, the municipalities located inside the outer limit of the greenbelt accounted for approximately 35 per cent of the total population growth in the Region. Therefore, approximately 65 per cent of the growth took place elsewhere, primarily in the three new urban communities outside of the greenbelt.

What is really significant however, is the growth situation experienced in the last five years. Between 1976 and 1981, 97% of the total population growth in Ottawa-Carleton occurred in the three urban communities outside of the greenbelt. In fact, in the same period the population of the municipalities inside the outer limit of the greenbelt declined by over 2,000 persons. Upon further analysis it can be seen that the total population of the three older urban municipalities of Ottawa, Vanier and Rockcliffe Park has declined continually since 1971 and by 1981 had dropped by over 11,000 persons. Therefore, it can be deduced that the majority of the net growth inside the greenbelt took place in new subdivisions in the Cities of Nepean and Gloucester.

Why has population inside the greenbelt, especially in the three older urban municipalities of Ottawa, Vanier and Rockcliffe Park declined in recent years? The answer is primarily related to decline in the size of households, that is the number of people living in each housing unit.

The decline in household size is an overall regional trend. Between 1971 and 1981 the average household size in Ottawa-Carleton declined from 3.3 persons per household to 2.7 persons per household.

Between 1971 and 1981 the population of Ottawa-Carleton increased by 16 per cent while the number of households increased by nearly 46 per cent.

The reasons for the imbalance between population growth and household growth and the resultant decline in average household size are related to: a) changes in the age structure of the population; b) changes in the propensity to form households; c) a general decrease in overall fertility rates which has resulted in smaller families; and d) other socio-economic and demographic factors possibly related to change in life styles, and accommodation and location preferences.

## IMPLICATIONS OF CONTINUED TRENDS IN THE GROWTH OF HOUSEHOLDS

A recent report on land-use prepared by the Regional Planning Department has shown that the per capita consumption of land for urban purposes between 1971 and 1981 was much greater than the consumption in the 1961 to 1971 period. This situation if it were to continue would have serious implications on the validity of the Official Plan assumptions used in the early 1970's in determining the future land requirements of the Region.

## OTTAWA-CARLETON EMPLOYMENT GROWTH 1971-1981

In the period 1971 to 1981 the total number of jobs in the Ottawa-Carleton Region is estimated to have increased from approximately 214,400 to approximately 293,700 or an increase of 79,300 jobs. In comparison, between 1961 and 1971 the number of jobs increased by over 73,300. The significance of these relatively similar levels of employment growth is only apparent on comparison with the growth of population for these two decades.

In the decade 1961 to 1971 the population of the Ottawa-Carleton region grew by nearly 114,000 persons. While in the 1971 to 1981 period the net population increase was 35 per cent less, or approximately 75,000 persons.

The ratio then between people and jobs as a result has declined from 2.3 persons supported by one job in 1971 to 1.9 persons supported by one job by 1981.

Therefore, more jobs have been required to support the population growth in the last decade than in the previous one.

This means that to achieve the same amount of population growth experienced in the late sixties to meet the expectation of the Regional

Official Plan of 450,000 jobs supporting a population of one million, requires the creation of a larger number of jobs. This has implications for the future amount of land required for employment activities and the services required to support them especially since per capita consumption of commercial, industrial and institutional land in the urban area has increased dramatically in the last decade.

Why has the situation occurred?

To understand the reasons for the employment growth experienced in the last decade requires an understanding of the complex relationships between population and jobs. This relationship has been described in detail in a previous study undertaken by the Planning department and is elaborated on further in the report Employment Projections Ottawa-Carleton 1981-2001.

Suffice it to say that the major influences on the last decade that resulted in the observed changes were primarily related to increases in the number of labour force age and the labour force participation rates of these people. In addition, between 1976 and 1981, part-time employment increased by 42% while full-time employment increased by only 3%. This increase in part-time employment was a significant contributing factor to the increase in participation rates.

## POPULATION AND EMPLOYMENT PROJECTIONS OTTAWA-CARLETON 1981-2001

### POPULATION PROJECTIONS 1981-2001

A review of possible and probable population projections was recently undertaken. The objective was to decide upon a range of projections which would represent a reasonable range for reviewing future growth options in the Region.

Two population projections were chosen. The low projection applies current trends with respect to age-specific fertility, and mortality rates and uses a net in-migration level which is based upon the average net-migration of the 1976 to 1981 period (1,760 people per year) on a constant annual basis to the year 2001. The result is a population of 623,000 in the Region in the year 2001.

A high population projection was also developed. The major difference is an assumption of an average of 6,000 net in-migrants per year after 1981 for the next 20 years. This level of migration is significantly higher than the average net migration of the last 20 years which was estimated to have been approximately 4,950 per year.

The application of these demographic assumptions on a constant annual basis result in a total population of 723,000 in the Ottawa-Carleton region in the year 2001.

POPULATION: OTTAWA-CARLETON
1981-2001

| Assumption | 1981 | 1986* | 1991* | 1996* | 2001* |
|---|---|---|---|---|---|
| LOW | 546,772 | 573,000 | 596,000 | 612,000 | 623,000 |
| HIGH | 546,772 | 595,000 | 643,000 | 685,000 | 723,000 |

Source: Ottawa-Carleton Planning Department April, 1982

*Population rounded to nearest thousand

These two projections delineate a range of populations that could be achieved in the Region by the turn of the century.

## EMPLOYMENT PROJECTIONS 1981-2001 RELATIONSHIP BETWEEN POPULATION AND JOBS

Two employment projections have been prepared in conjunction with the population projections.

1. The Low Projection

   Approximately 353,000 jobs are required to achieve the lower population projection.

   This level of growth would result if federal government grew at the modest rate of 0.3% a year and most other sectors continued their recent trends.

   In terms of real growth in the economy the low projection is similar to the experience of the period 1976 to 1981.

2. The High Projection

   Approximately 443,000 jobs are required to achieve the higher population projection.

   This level of employment could be achieved if the Federal government maintained an average rate of growth of 2.0 per cent per year and the rate of job creation in most other sectors was greater than recent trends due to higher levels of population growth and the associated demands for population serving activities.

It has been determined that the number of persons supported per job will decrease in the future:

a) due to increased participation rates combined with;

b) an increased proportion of the population over 15 years of age (labour force age);

c) due to the maintenance of a constant proportion of the population with more than one job.

Both projections assume a constant 17 per cent of the labour force works part-time. However, between 1976 and 1981, part-time employment increased from 13% to 17% of all jobs representing 68% of the total increase in employment. This proportion may continue to increase thereby producing higher participation rates and a lower number of persons supported per job.

The range of population and employment identified in this summary forms the basis for reviewing and testing future options for the geographic distribution of the anticipated increases in population and employment within the Ottawa-Carleton Region.

References

For more detail, please refer to the following technical reports prepared by staff of the Policy and Program Division, Planning Department:


1) Population Forecasts Ottawa-Carleton, 1976-2001; October 1980

2) Official Plan Review: Employment Projections, Ottawa-Carleton, 1981-2001; April 1983.

3) Official Plan Review: Population Projections, Ottawa-Carleton, 1981-2001; April 1983

4) Official Plan Review: Options for Future Growth, Ottawa-Carleton, 1981-2001; April 1983

Appendix 3.

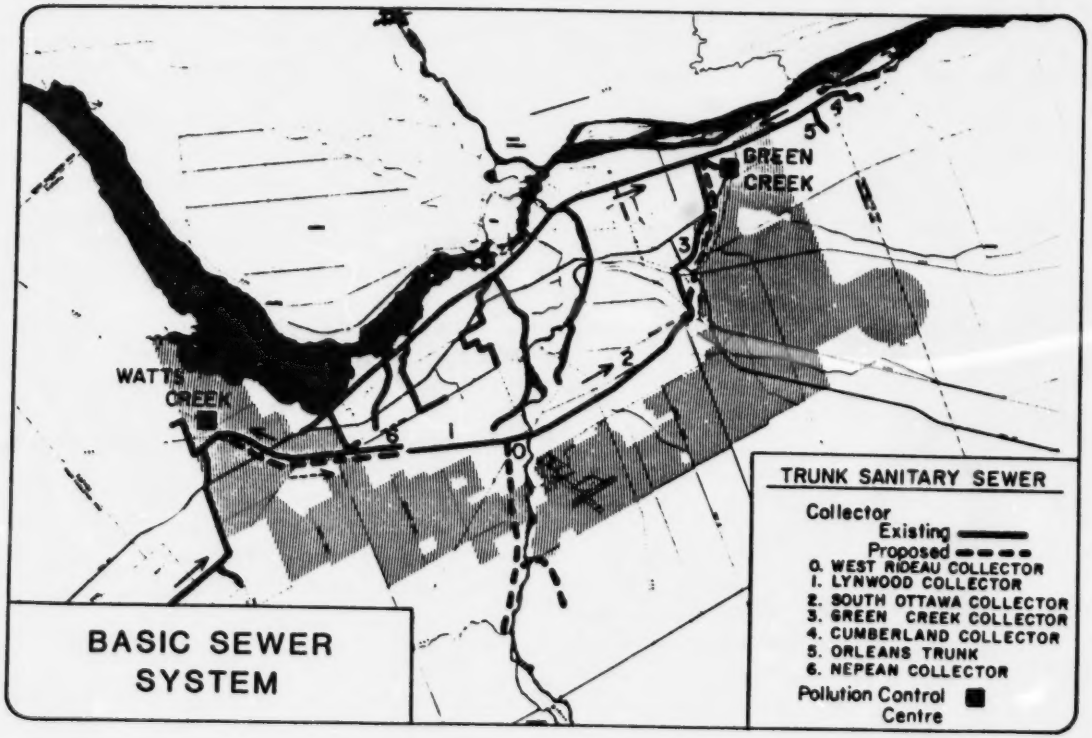
## COSTS OF INFRASTRUCTURE

### Sewers And Sewage Treatment

The Region has responsibility for major sewage collectors and all sewage treatment. The basic Regional plan for the expansion of these services is as follows.

Watts Creek Sewage Treatment Plant in Nepean, which currently takes sewage flows from south-west Nepean, Kanata, Stittsville (and eventually Richmond) is operating close to capacity and will be phased out. It is not cost effective to expand this facility and add secondary treatment (as required by the Province).

Sewage flows from lands roughly south of Baseline Road and Walkley road are taken via the Lynwood collector and the South Ottawa Collector to the Green Creek Pollution Control Centre (on the Ottawa River in Gloucester). Before the Watts Creek Sewage Treatment Plant can be phased out, the Lynwood Collector has to be extended west to divert the sewage flows from west Nepean, Kanata, Stittsville and Richmond (approximate cost $25M+). In addition, the Green Creek Collector Sewer which delivers the combined flows from the Lynwood and South Ottawa collectors to the Green Creek Pollution Control Centre will need to be expanded (twinned) - it is currently a bottleneck in the system (approximate cost $25M+).




The system of sewage pipes taking flows from the main urban area (much of Nepean, Ottawa, Gloucester and Vanier) drains north to interceptor sewers along the Ottawa River and then east to the Green Creek Pollution Control Centre. At present, these flows are greatly in excess of projected flows due to the infiltration of groundwater or cross connections with storm sewers. The ultimate costs of identifying and correcting these problems is not known but could be in the hundreds of millions of dollars. Until these problems are corrected, the Works Department is recommending that major growth should not occur in this drainage area.

Finally, flows from the East Urban

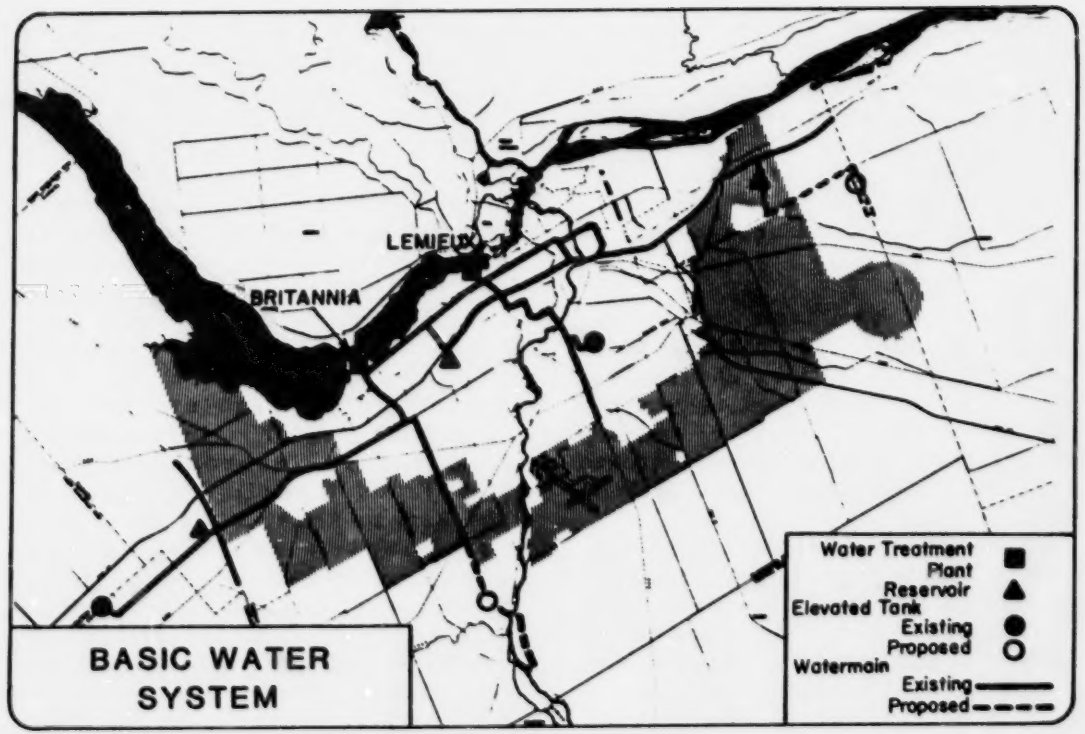
Community (Orleans) move west via the Orleans Cumberland Collector to the Green Creek Pollution Control Centre. This collector is of sufficient size to handle in excess of 100,000 people east of the Greenbelt.

To handle increased flows resulting from urban growth (wherever it locates) the Green Creek Pollution Control Centre will require expansion (approximate cost $30.5M+). In addition, secondary treatment may have to be added to meet with Provincial guidelines (approximate cost - $50M).

In addition to these major system expansion items, other improvements will be needed; these being dependant on the specific location of growth. For instance, approximately $2M will be required in the west to upgrade the Glen Cairn Trunk Sewer, the force main, and update the Hazledean pumping station.

In the east, to service the industrial lands south of Innes Road and the residential lands in the extreme south-east corner of the East Urban Community, an additional trunk sewer will be required (approximate cost $2.3M).

To go south (ie expand the South Urban Community out from Barrhaven), the West Rideau Collector will need to be extended (approximate cost $15M to $23M depending on how far it is extended into Nepean and whether it crosses the Rideau River to service lands in Gloucester).



BASIC WATER SYSTEM

In very rough numbers, the improvements required to the Regional sewage system to, provide for the urban population at the "low" projection (563,000) will cost $96M+. To expand the system to provide for the urban population at the "high" projection (653,000) will cost an additional $68M+. These estimates include the expansion of the Green Creek Sewage Treatment Plant, the addition of secondary treatment and servicing of a major area of land south of the Greenbelt in both Nepean and Gloucester. But the estimates do not include the corrections of problems inside the Greenbelt - the costs of which could be equal or double the total given above.

## Water Mains and Water Treatment

The Region has complete responsibility for the treatment and delivery of water within the Region (to those on water service). The basic Regional plan for the expansion of the water system is as follows.

Water is taken from the Ottawa River and purified at two filtration plans (Britannia and Lemieux Island). An expansion is planned for the Lemieux Island Filtration Plant which will accomodate growth to 2001 (approximate cost $8.4M).

Existing pumping capacity can support 600,000 persons but an expansion of the Carlington Heights Reservoir will be needed to develop this capacity (approximate cost $12M). In addition, a major program of uprating the central feeder main system will be required (approximate cost $8M).

In addition to these major systems expansions, other improvements will be required; these being dependant on the specific location of growth. To provide for growth in the west, the Glen Cairn Reservoir will require expansion (approximate cost - $8M), and the major water main along Baseline Road would need to be twinned (approximate cost - $8M). The Glen Cairn Pumping Station would also need expansion and the pumps uprated (approximate cost $0.5M to $0.7M). Other modifications in the local feeder mains would also be required (approximate cost $1.3M).

Growth in the south, relies upon some of the same improvements as given above - that is, expansion of the Glen Cairn Reservoir and twinning of the major main from Britannia to Glen Cairn. In addition, improvements to the Barrhaven pumping station and Greenbank feeder main is needed immediately (approximate cost $0.5M). Additional growth west of the Rideau River will require a new pumping station, a new elevated tank and connecting feeder mains (approximate cost $7.5M). To provide for additional growth - including growth east of the Rideau River, will require additional expansion to the Glen Cairn Reservoir, a second elevated tank, and interconnecting feeder mains (estimated cost - $12.5M).

Growth in the east to (to a population of about 60,000) will require additional pumping capacity at the Orleans Reservoir and associated feeder mains (approximate cost $9M). Further growth (to a population of about 100,000) will require a new pumping station, improvements to the Hurdman Bridge Pumping Station, and improvements to feeder mains (approximate cost - $6M).

In very rough numbers, the improvements required to support todays population, and which are budgeted, amount to approximately $3M. To get to the Low Projection (563,000 urban), will cost $25M and to get to the High Projection (653,000 urban), will cost an additional $56M.

## Roads and Transitways

The existing Regional Plan provides for a future network of regional roads and transitways (roadways dedicated to buses) to handle projected traffic volumes in the urban area (urban population of up to 800,000 people). Many of the road facilities in the Plan were viewed as rather long range requirements. The Plan also clearly established public transit improvements as a higher priority then road improvements.

Although the population growth rate has fallen over the past decade, the amount of travel has increased. Simply stated, more people are making a journey to work (and return) every day. And since roads and transitways have to be designed to accomodate peak flows, (ie. the "rush-hour"), the amount and timing of employment related travel becomes a critical concern in transportation planning. Other types of travel (recreation, shopping etc.) have

also increased but these tend to occur at off-peak times and hence have less impact on road requirements.

The Plan's current emphasis on the development of transit improvements is to reduce the requirements for new (or widened) roadways and the community disruption this would bring to established neighbourhoods inside the Greenbelt. The so called "first phase" of the rapid transit development program will consist of dedicated transit roadways from Baseline Road at Woodroffe in Nepean, east along Byron Ave, Scott and Albert Streets into Sandy Hill, then south across the Hurdman Bridge. From here, one line will run further south to South keys and another will run east to the St. Laurent Shopping Centre (refer to map). The cost of implementing this first phase is roughly estimated at $288M of which approximately $85M has been spent to date ($203M-balance). In subsequent phases, the transitways are to be extended west to Bayshore and ultimately to the Kanata town centre and east to the town centre in Orleans. The costs of these extensions are roughly approximated at $60M in the west and $25M in the east.

Even with this transitway system in place, considerable road improvements will be required to handle increased automobile traffic. Many of these improvements will be needed in the near future to maintain a satisfactory level of service on roads inside the Greenbelt. Such improvements include road widenings such as along Walkley Road, Woodroffe Ave, Montreal Road and Riverside Drive. In addition new facilities will be required such as the Vanier Arterial, the Bronson-Portage Bridge connection, the Preston-Chaudiere Bridge connection and the Hunt Club Bridge and approaches. In total, this program of improvements to the road network inside the Greenbelt is estimated at $243M. These costs do not include improvements to provincial roads (such as the Queensway) or federal roads (such as the parkways).

In addition, major improvements will be needed to support future growth. In the west (to reach a population level of 100,000 in Kanata), these include the Terry Fox Drive extension, Knoxdale-Fernbank, Timm Drive and Regional Road 248 at a total estimated cost of approximately $158M.

In the east (to reach a population of 100,000 in Orleans) the required roadway improvements include Orleans Boulevard/Jeanne d'Arc, the Blackburn Bypass, Regional Road 31/47 and Innes/Walkley at a total estimated cost of approximately $111M.

In the south, improvements, such as the widening of Greenbank, and a program to build internal roads will be required at a total estimated cost of $79M (for a population of 60,000).

In rough numbers, the improvements required to meet the needs of the existing population are $154M for roads and $203M for transit. To provide for population at 2001 under "low" growth will cost an additional $204M on roads and $85M on transit. To get to the "high" will cost an additional $233M on roads and $50M on transit.

A summary listing each facility, its estimated cost, and the growth projection under which it is required forms part of this Appendix.

WATER

NAME AND COST OF FACILITY

(ALL COSTS IN MILLIONS OF DOLLARS - GROSS 1984)

| EXISTING POPULATION | | | LOW PROJECTION | | | HIGH PROJECTIONS | | |
|---|---|---|---|---|---|---|---|---|
| WATER | Cost | Total Cost | WATER | Cost | Total Cost | WATER | Cost | Total Cost |
| Facility | | | Facility | | | Facility | | |
| Upgrade Barrhaven Pumping ) | 1.6 | | Expand Glencairn pumping station | 0.5 | | Expand Glencairn reservoir | 8.0 | |
| Station Feedermain ) | | | Sub-total Kanata | | 0.5 | Twin Baseline Road Main | 8.0 | |
| Improvements ) | | | Pumping Station | 1.0 | | Expand Glencairn pumping Station | 0.2 | |
| New Pumping facility ) | — | | Jockvale elevated tank | 1.3 | | Incidentals WUC | 1.3 | |
| Sub-total Barrhaven | 1.6 | 1.6 | Feeder mains | 5.2 | | Sub-total Kanata | 17.5 | 17.5 |
| Feedermains Kanata | 0.3 | | Sub-total Barrhaven | 7.5 | | Expand pumping station | 0.3 | |
| Sub-total Kanata | 0.3 | 0.3 | Expand pumping station | 0.5 | | Expand Glencairn reservoir | 8.0 | |
| Orleans Tank | 0.8 | | Expand Orleans reservoir | 7.5 | | Manotick elevated tank | 1.3 | |
| Orleans Pumping Station | 0.25 | | Feeder mains | 1.0 | | Feeder Mains | 2.9 | |
| Sub-total Orleans | 1.05 | 1.05 | Sub-total Orleans | 9.0 | 9.0 | Sub-total Barrhaven | 12.5 | 12.5 |
| GRAND TOTAL | | 2.95 | Expand Lemieux Island Plant | 8.4 | | New Orleans pumping station | 1.5 | |
| | | | Sub-total Filtration Plant | 8.4 | 8.4 | Expand Hurdman pumping station | 0.5 | |
| | | | GRAND TOTAL | | 25.4 | St. Laurent-Hurdman main | 1.5 | |
| | | | | | | Feeder main pumping station - elevated tank | 1.5 | |
| | | | | | | Feeder mains | 1.5 | |
| | | | | | | Sub-total Orleans | 6.0 | 6.0 |
| | | | | | | Expand Carlington reservoir | 12.0 | |
| | | | | | | Upgrade inner area water system | 8.0 | 8.0 |
| | | | | | | Sub-total inside greenbelt | 20.0 | 20.0 |
| | | | | | | GRAND TOTAL | | 56.0 |

## SEWERS

### NAME AND COST OF FACILITY
(ALL COSTS IN MILLIONS OF DOLLARS - GROSS 1984)

| EXISTING POPULATION | | | LOW PROJECTION | | | HIGH PROJECTIONS | | |
|---|---|---|---|---|---|---|---|---|
| SEWERS | Cost | Total Cost | SEWERS | Cost | Total Cost | SEWERS | Cost | Total Cost |
| Facility | | | Facility | | | Facility | | |
| None | | | Extend Lynwood Collector to Watts Creek Plant | 25.0 | | Twin part Glen Cairn trunk | 1.0 | |
| | | | 1/3 South Ottawa collector[1] | 8.3 | | Twin force main | 0.8 | |
| | | | Sub total Kanata | 33.3 | 33.3 | Sub total Kanata | 1.8 | 1.8 |
| | | | West Rideau Collector/Mosquito Creek | 15.0 | | Extend West Rideau Collector and Mosquito Creek Collector | 8.0 | |
| | | | 1/3 South Ottawa collector[1] | 8.3 | | | | |
| | | | Sub-total Barrhaven | 23.3 | 23.3 | Collector Sewer south Strandherd | 8.0 | |
| | | | 1/3 South Ottawa collector[1] | 8.4 | | Sub-total Barrhaven | 16.0 | 16.0 |
| | | | Sub total Inside Greenbelt | 8.4 | 8.4 | Provide Secondary Treatment | 50.0 | |
| | | | Expand Green Creek Plant | 30.5 | | Sub-total Treatment Plants | 50.0 | 50.0 |
| | | | Sub total Treatment Plants | 30.5 | 30.5 | | | |
| | | | GRAND TOTAL | | 95.5 | Grand Total | | 67.8 |

[1] Works department figures arbitrarily split between low and high projections

## ROADS

### NAME AND COST OF FACILITY

(ALL COSTS IN MILLIONS OF DOLLARS - GROSS 1984

| EXISTING POPULATION | | | LOW PROJECTION | | | HIGH PROJECTIONS | | |
|---|---|---|---|---|---|---|---|---|
| ROADS | Cost | Total Cost | ROADS | Cost | Total Cost | ROADS | Cost | Total Cost |
| Facility | | | Facility | | | Facility | | |
| Walkley Road (Bank-Heron) | 3.4 | | Campeau Drive | 15.0 | | Carling (RR49-Moodie) | 9.0 | |
| Heron Road (Bank-Sandalwood) | 4.8 | | Castle Frank | 11.0 | | Fernbank-Richmond Hunt Club | 15.0 | |
| Heron/Walkley (Sandalwood-Conroy) | 4.8 | | Eagleson Road | 10.0 | | Timm Drive | 2.0 | |
| Walkley (Conroy-Russell) | 4.0 | | Terry Fox Drive | 35.0 | | Brittania Parkway | 25.0 | |
| Walkley Extension | 9.2 | | Internal Roads Kanata | 61.0 | | | | |
| Nicholas-Waller | 0.02 | | | | | External Roads Kanata | 51.0 | |
| Pre-engineering services | 0.7 | | Total Kanata | | 61.0 | | | |
| Woodroffe (Norice-Baseline) | 1.1 | | | | | Eagleson Road | 10.0 | |
| Hemlock (St. Laurent-Birch) | 0.06 | | Blackburn Hamlet by-pass | 13.0 | | Katimavik | 3.0 | |
| Greenbank (Knoxdale-Banner) | 0.05 | | | | | RR248 | 3.0 | |
| Kent St. Catherine-Somerset | 0.02 | | External Roads Orleans | 13.0 | | Terry Fox | 30.0 | |
| Intersection Improvements | 5.4 | | | | | Internal Roads Kanata | 46.0 | |
| Resurfacing program | 4.2 | | Jeanne D'Arc and Orleans Boulevard | 11.0 | | Total Kanata | 97.0 | 97.0 |
| Beechwood Avenue | 3.5 | | Town Centre Ring Road | 4.0 | | | | |
| Montreal Road | 8.8 | | St. Joseph (Queensway-Jeanne | | | 4 lane Parkway | 25.0 | |
| Prince of Wales | 4.6 | | d'Arc) | 7.0 | | Innes-Walkley | 35.0 | |
| Vanier Arterial | 12.6 | | Internal Roads Orleans | 22.0 | | External Roads Orleans | 60.0 | |
| Bronson-Portage connection | 7.8 | | | | | | | |
| Innes Road (Tauvette-Cleroux) | 3.6 | | Total Orleans | | 35.0 | Tenthline | 4.0 | |
| Riverside Drive | 9.6 | | | | | St. Joseph | 2.0 | |
| Practical Standards Program | 4.0 | | Cedarview (Jockvale-Fallow- | | | RR31/47 connection | 2.0 | |
| Hunt Club (Merivale-Bowesville) | 20.2 | | field) | 1.0 | | Innes | 8.0 | |
| Richmond (Parkway-Churchill) | 3.2 | | Fallowfield (Cedarview- | | | Internal Roads Orleans | 16.0 | |
| Hunt Club (Bank-Hawthorne | 9.0 | | Woodroffe) | 6.0 | | | | |
| Blair (Ogilvie-Montreal) | 3.0 | | Greenbank (Jockvale-Malvern) | 2.0 | | Total Orleans | 76.0 | 76.0 |
| Merivale (Kirkwood-Parkway) | 5.4 | | Greenbank (Fallowfield- | | | | | |
| Richmond Rd. (Carling-Parkway) | 1.4 | | Knoxdale) | 6.0 | | Internal Roads Barrhaven | 60.0 | 60.0 |
| Baseline (RR248-Greenbank) | 5.2 | | Woodroffe (Fallowfield-Vaan) | 4.0 | | | | |
| Richmond (City Limits-Pinecrest) | 2.6 | | | | | | | |
| McKay Street | 1.1 | | Total Barrhaven | 19.0 | | GRAND TOTAL | | 233.0 |
| Booth Street(Albert-City Limits) | 0.7 | | | | 19.0 | | | |

ROADS (Cont'd)

NAME AND COST OF FACILITY

(ALL COSTS IN MILLIONS OF DOLLARS - GROSS 1984)

| EXISTING POPULATION | | | LOW PROJECTION | | | HIGH PROJECTIONS | | |
|---|---|---|---|---|---|---|---|---|
| ROADS | Cost | Total Cost | ROADS | Cost | Total Cost | ROADS | Cost | Total Cost |
| Facility | | | Facility | | | Facility | | |
| Meadowlands Drive | 1.7 | | Baseline (Greenbank-Prince of Wales) | 5.0 | | | | |
| Prince of Wales (Baseline-Preston) | 2.9 | | Hawthorne-Walkley | 1.0 | | | | |
| Fisher Ave (Baseline-Holland) | 2.1 | | Hunt Club West | 24.0 | | | | |
| Tremblay Road | 0.6 | | Hunt Club East | 19.0 | | | | |
| Richmond Rd(Windemere-Churchill) | 0.8 | | Preston Chaudiere | 22.0 | | | | |
| Fisher Avenue (Dynes-Baseline) | 0.6 | | Nicholas-Industrial | 8.0 | | | | |
| | | | Scott Albert | 1.0 | | | | |
| Total Inside Greenbelt | 152[1] | | Queensway Collector Distributors | 7.0 | | | | |
| | | | Scott extension | 2.0 | | | | |
| | | | | 89.0 | 89.0 | | | |
| GRAND TOTAL | | 152 | GRAND TOTAL | | 204.0 | | | |

[1]May not add because of rounding

## TRANSITWAYS

### NAME AND COST OF FACILITY
(ALL COSTS IN MILLIONS OF DOLLARS - GROSS 1984)

| EXISTING POPULATION | | | LOW PROJECTION | | | HIGH PROJECTIONS | | |
|---|---|---|---|---|---|---|---|---|
| TRANSITWAYS | Cost | Total Cost | TRANSITWAYS | Cost | Total Cost | TRANSITWAYS | Cost | Total Cost |
| Facility | | | Facility | | | Facility | | |
| Phase 1 Woodroffe/Baseline - Blair Road | | | Blair - Orleans Town Centre | 25.0 | | South Urban Community Town Centre | 50.0 | |
| (288.0 - 85.0 spent to date) | 203.0 | 203.0 | Woodroffe/Queensway - Bayshore-Town Centre Kanata | 60.0 | | Sub-total | 50.0 | 50.0 |
| GRAND TOTAL | | 203.0 | GRAND TOTAL | 85.0 | 85.0 | GRAND TOTAL | | 50.0 |

Appendix 4

## FUTURE URBAN RESIDENTIAL LAND REQUIREMENTS

A projection of future urban residential land requirements was developed for the purpose of the Official Plan Review. The projection exercise consisted of several sequential steps:

a) population projection
b) household projection
c) projection of housing unit requirements
d) assumption about "mix" of structure types
e) assumption about construction densities
f) calculation of residential land requirements.

The population projections used throughout the Official Plan Review include a "low" equal to 623,000 persons in the Region by 2001 and a "high" equal to 723,000 persons by 2001. The urban portion of these Regional totals was assumed to be 90% (a continuation of the historical relationship between urban and rural populations). This gives "low" and "high" urban population projections (at 2001) equal to 563,000 and 653,000 persons respectively.

Using these population levels, the next step was to prepare a household projection. This was done by applying age-specific "propensities" to form households against the population projection (the "propensity" to form a household is a statistical measure of the likelihood of any individual forming and maintaining separate living arrangements).

Then, the household projection was translated into a requirement for new housing units. The number of units required is not equal to the expected number of new households since allowances have to be made for vacancies in the housing stock and to compensate for demolitions and conversions. When such allowances were made the following unit requirements were indicated:

HOUSING UNIT REQUIREMENTS 1981-2001
(units per year)

| Low Projection | | High Projection | |
|---|---|---|---|
| 1981-90 | 1991-2000 | 1981-90 | 1991-2000 |
| 3800 | 2220 | 5470 | 3620 |

It should be noted that under either the "low" or "high" projection, housing unit requirements fall off substantially in the second decade (1991-2000).

The next step was to formulate an assumption about the likely "mix" of housing types for the units that will be built. Based on past building records, tempered by a judgement about the number of apartment units* likely to be built, the following mix was selected:

| Type | % |
|---|---|
| singles | 21 |
| semis | 9 |
| rows | 32 |
| apartments | 38 |
| | 100 |

Then an assumption about likely construction densities was formulated based on recent building activity and approved development applications as follows:

*For singles, semis and rows, an average of the past 10 years building record was used. For apartments, the past 20 years record was used excluding the period 1972-75 which saw extraordinary apartment building activity (it is our judgement that we should not plan on the basis of this level of apartment construction occurring again).

| Type | Units Per Hectare* |
|---|---|
| singles | 15.5 |
| semis | 24.7 |
| rows | 34.3 |
| apartments | 100.0 |

Using the projection of unit requirements and assumptions about likely housing mix and density, residential land requirements were calculated as presented in Table 1).

A second method was then used to calculate residential land requirements. The reason for this second method is based on the observation that residential growth is progressively shifting outside the Greenbelt (a process which is expected to intensify into the future) and the knowledge that the urban communities outside the Greenbelt are being planned at low densities (averaging approximately 20 units per hectare) as compared to lands inside the Greenbelt (averaging approximately 45 units per hectare).

For this second estimate it was assumed that 85% of the new residential units built in the period 1981-2001 would be built outside the Greenbelt. Residential land requirements as determined through this second method are shown in Table 2.

This second method suggest that on average between 138 hectares and 208 hectares of residential land will be required per year in the period 1981-2001 under the "low" and "high" projections respectively.

Table 1 URBAN RESIDENTIAL LAND REQUIREMENTS 1981-2001 (hectares per year)

| Low Projection | | | High Projection | | |
|---|---|---|---|---|---|
| Type | 1981-90 | 1991-2000 | Type | 1981-90 | 1991-2000 |
| single | 51.5 | 30.1 | single | 74.2 | 49.0 |
| semi | 13.8 | 8.1 | semi | 19.8 | 13.1 |
| row | 35.5 | 20.7 | row | 51.0 | 33.8 |
| apartment | 14.4 | 8.4 | apartment | 20.8 | 13.8 |
| Total | 115.2 | 67.3 | Total | 165.8 | 109.7 |

Table 2 URBAN RESIDENTIAL LAND REQUIREMENTS 1981-2001 (total hectares 1981-2000)

| | | |
|---|---|---|
| LOW | Inside Greenbelt 9,030 units @ 45 upha = | 201 ha |
| | Outside Greenbelt 51,170 units @ 20 upha = | 2,558 ha |
| | Total 60,200 units | 2,759 ha |
| HIGH | Inside Greenbelt 13,635 units @ 45 upha = | 303 ha |
| | Outside Greenbelt 77,265 units @ 20 upha = | 3,863 ha |
| | Total 90,900 units | 4,166 ha |

Summary

Within the limits of accuracy that such projections can be made, it is our judgement that future urban residential land requirements will fall somewhere in the range of 70 to 210 hectares per year from now until the turn of the century. Under either the "low" or "high" projection, land consumption will be higher in the first decade (1981-1990) than in the second (1991-2000).

*includes building lots plus road allowances internal to the development.

Appendix 5

## SUMMARY OF TRANSPORTATION ANALYSIS

### Analysis

As input into the Official Plan Review ACPAT (Advisory Committee on Planning and Transportation) established a Land Use Transportation Subcommittee. Membership of the subcommittee included:

- National Capital Commission
- Ministry of Transportation and Communications Ontario
- Ministry of Municipal Affairs and Housing Ontario
- Communauté Régionale d'Outaouais
- Ottawa-Carleton Transportation Dept.
- Ottawa-Carleton Planning Dept.

The committee examined 15 land development options based on two population projections (the high of 723,000 by 2001 and the low of 623,000 by 2001) three patterns of population distribution and three distributions of employment (jobs). The options are documented in a report published by the Planning Department entitled "Options for Future Growth 1981-2001" April 1983.

Forecasts of future travel demands for these "options" were generated by means of a computer model called TRANS, which is an application of the Urban Transportation Planning System (UTPS) package of computer programs. This modelling exercise has been documented in a report prepared by the Transportation Department entitled "Transportation component of the Official Plan Review, Regional Development strategy".

Analysis of the results of the TRANS model show that reductions in road needs would result based on a combined strategy of increasing transit usage and locating a larger part of future employment in the communities outside the Greenbelt.

Fig. 1 shows the distribution of average daily travel by car and transit for each hour to and from the central area in Ottawa-Carleton. The increasing modal split (i.e. the proportion using transit) in the rush hours, reduces the number of auto trips, so easing congestion and capacity problems.

Bar charts have been prepared for each of the eleven screenlines shown on Fig. 2. A screenline is a hypothetical line taken at strategic locations which cuts across a major travel corridor including all roads that serve travel in that corridor. For instance the so called "Green Creek" screenline includes the road capacity on all major east-west roads crossing Green Creek including the Queensway, Montreal Road, and Innes Road. These represent the conditions in the evening peak hour. The bar charts are shown in Fig 3.

The first bar of each chart shows 1981 travel information which was used as input into the TRANS model. The second bar shows the amount of travel projected by the model in 2001 based on the "worst case" population and employment distribution affecting that screenline. The number of transit and auto trips are shown.

The official plan now in place based its transportation planning strategy on giving transit priority over roads. This resulted in the establishment of modal split guidelines for most of the major screenlines. The good progress being made towards attaining these guidelines, the output of the model and the knowledge of future transit way construction led to a review of these guidelines. The New guidelines, in many cases revised upwards, are being proposed as follows:

## MODAL SPLIT GUIDELINES

| Screenline | 1971 | 1981 | 1974 Plan Guideline | Proposed Guideline |
|---|---|---|---|---|
| Green Creek | 2 | 26 | 20 | 40 |
| Rideau River North | 20 | 37 | 50 | 50 |
| Leitrim - Ramseyville | 0 | 0 | 0 | 0 |
| CNR East | - | 18 | 30[1] | 30 |
| Fallowfield Road | - | 12 | 30 | 30 |
| CNR West | 2 | 23 | 30 | 30 |
| Eagleson Road | - | 13 | - | 35 |
| Western Parkway | 11 | 27 | 30 | 40 |
| CPR | 14 | 44 | 50 | 50 |
| Rideau River South | 7 | 14 | 30 | 25 |
| Ottawa River | 8 | 22 | 50 | 35 |

- No information
1 Screenline located at Ramseyville and 417

FIGURE : 1

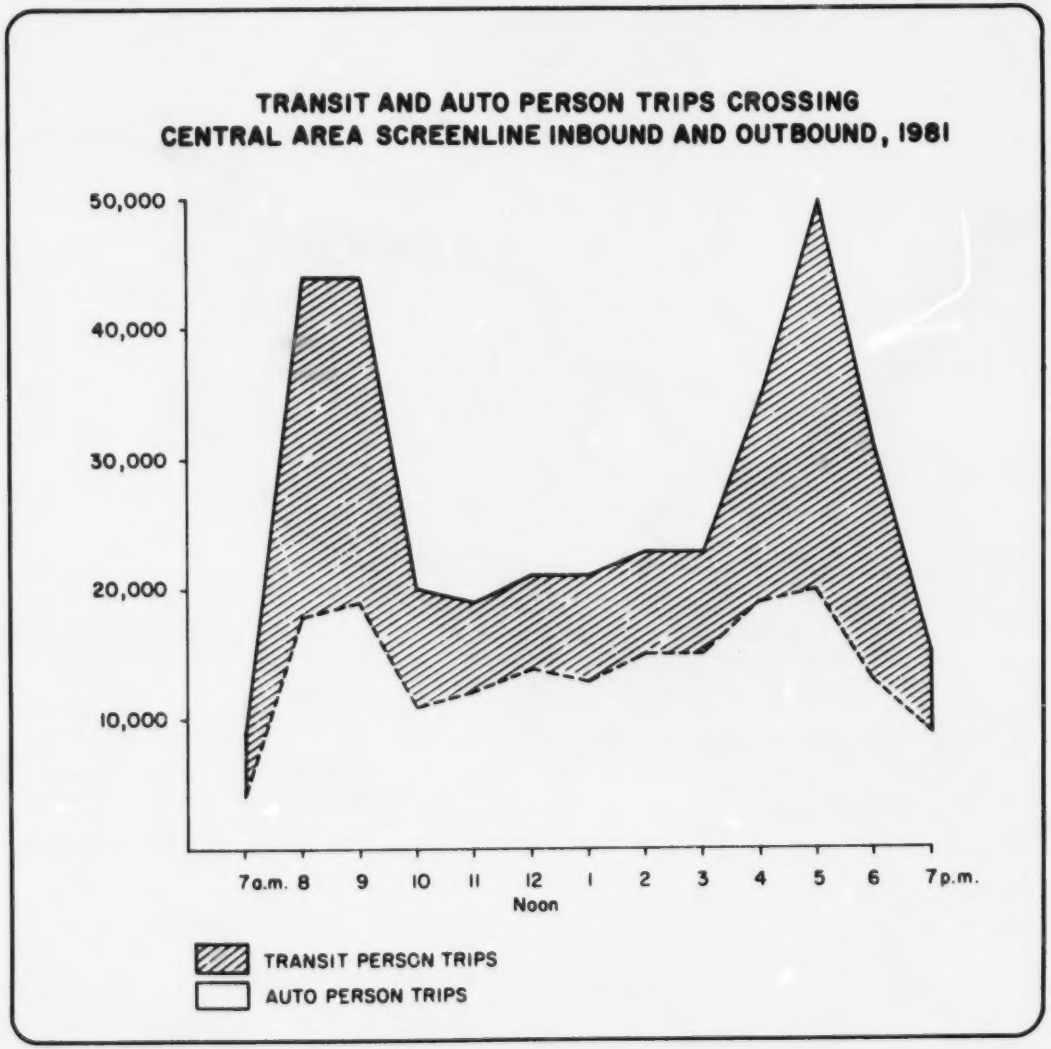
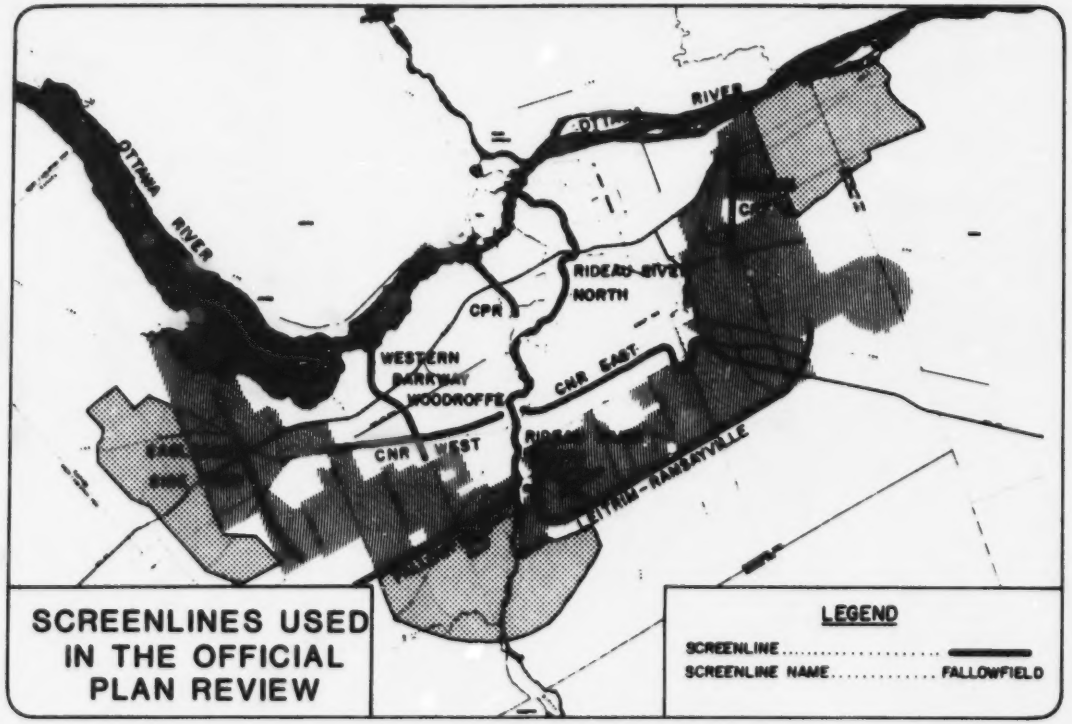

TRANSIT AND AUTO PERSON TRIPS CROSSING
CENTRAL AREA SCREENLINE INBOUND AND OUTBOUND, 1981
50,000
40,000
30,000
20,000
10,000
7a.m. 8 9 10 11 12 1 2 3 4 5 6 7p.m.
Noon
TRANSIT PERSON TRIPS
AUTO PERSON TRIPS

**FIGURE : 2**


OTTAWA RIVER
RIVER
RIDEAU RIVER NORTH
CPR
WESTERN PARKWAY WOODROFFE
CNR EAST
CNR WEST
KEMPTVILLE
SCREENLINES USED IN THE OFFICIAL PLAN REVIEW
LEGEND
SCREENLINE
SCREENLINE NAME..... FALLOWFIELD

The information in the third bar applies the new proposed modal split guidelines to the 2001 total trips shown in Bar 2.

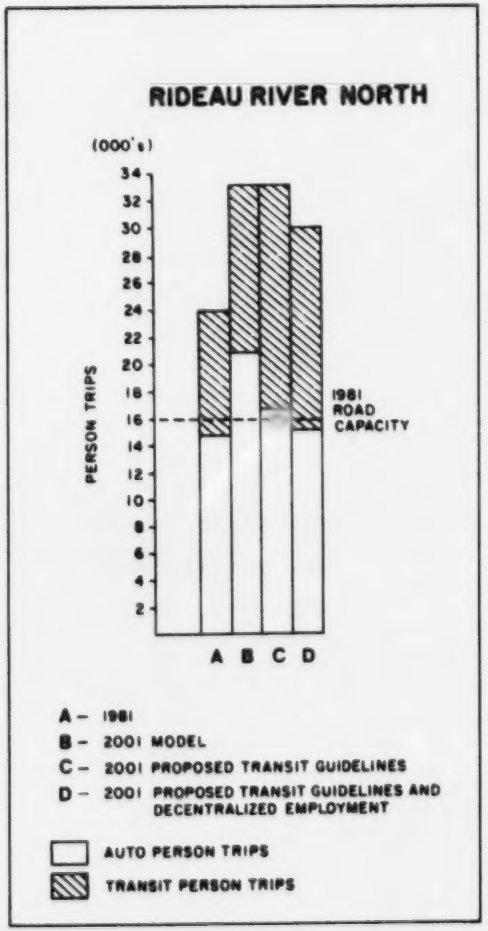
The input to the model relating to employment distribution was based on realistic assessments of future employment levels in Orleans, Barrhaven and Kanata based on their past performance, as follows:

| Employment High Population Projection | | |
|---|---|---|
| | 1981 | 2001 |
| Orleans | 2,300 | 11,000 |
| Barrhaven | 3,500 | 6,000 |
| Kanata | 7,200 | 23,000 |

One test was run using the employment levels which the existing official plan sets as a maximum guideline when these communities reach "full development". That guideline is 35,000 jobs at a population of 75,000 to 100,000.

Transportation demand in this test is shown in the fourth bar. In addition the proposed official plan guideline modal splits have been applied to the total demand for trips.

**FIGURE : 3**



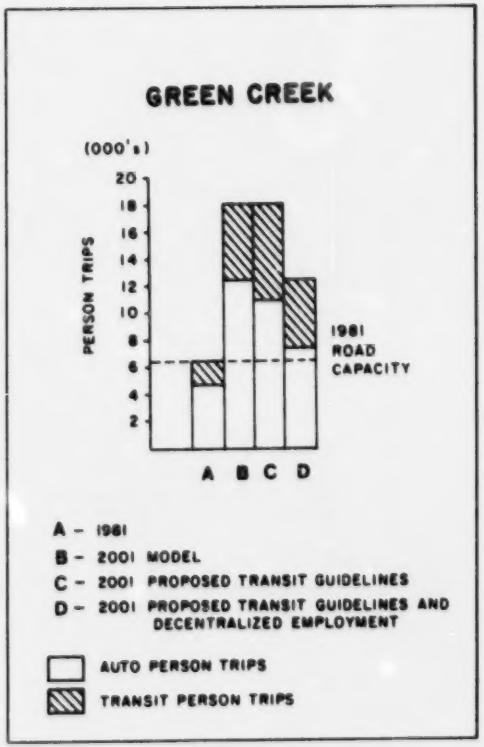
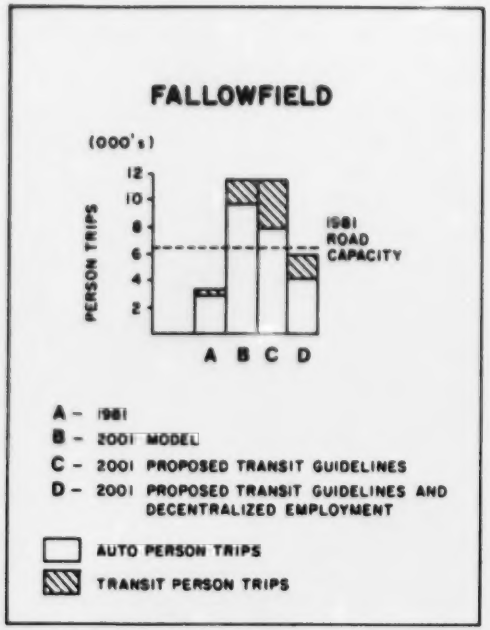
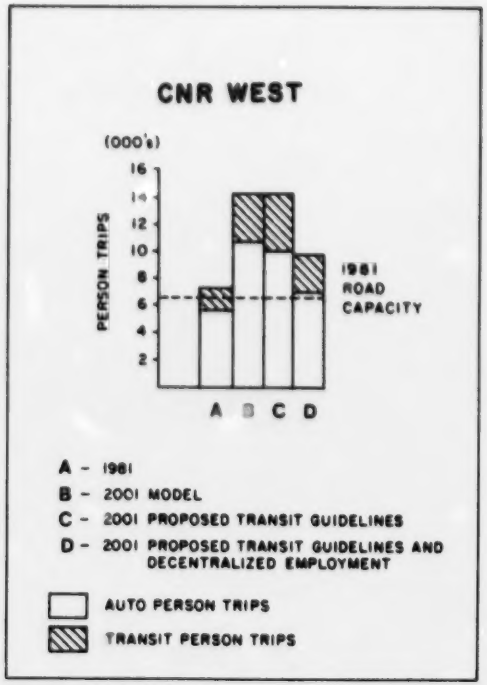



**FIGURE : 3** (Cont'd)



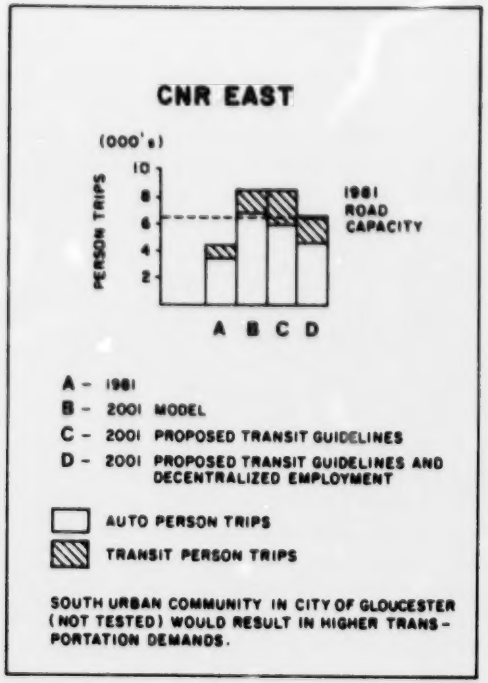
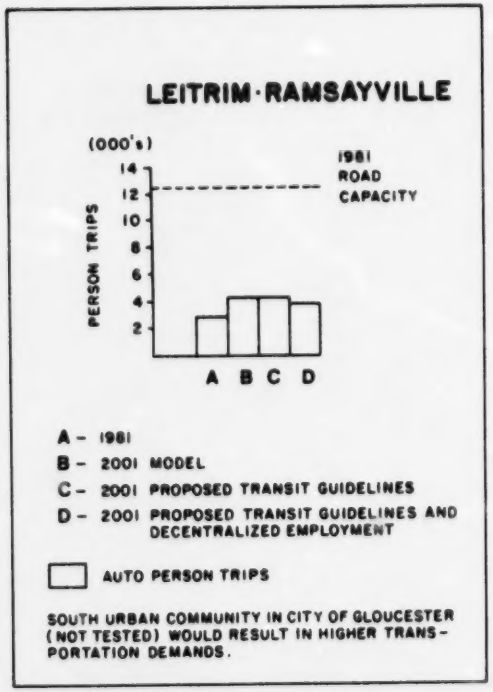
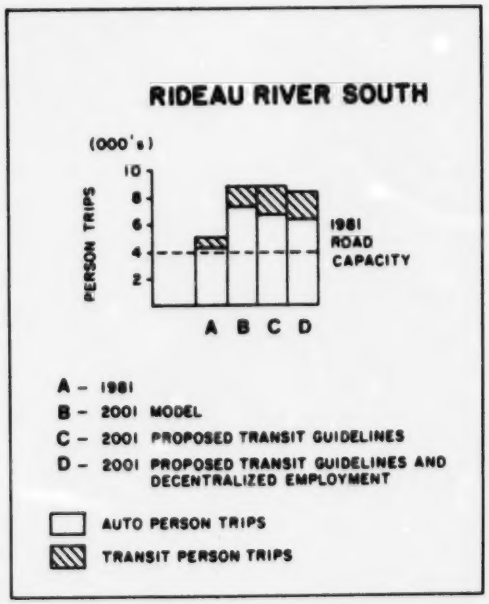



**FIGURE : 3** (Cont'd.)



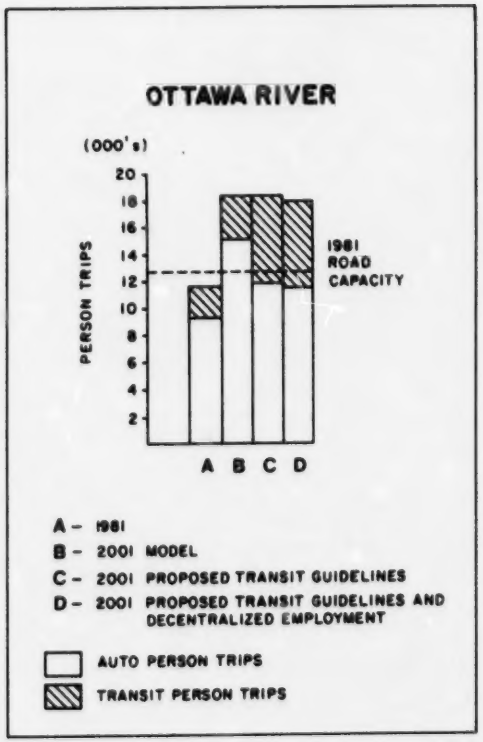
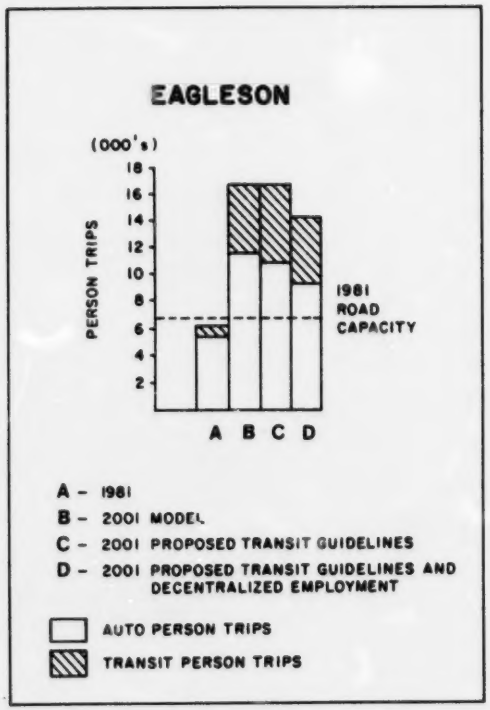
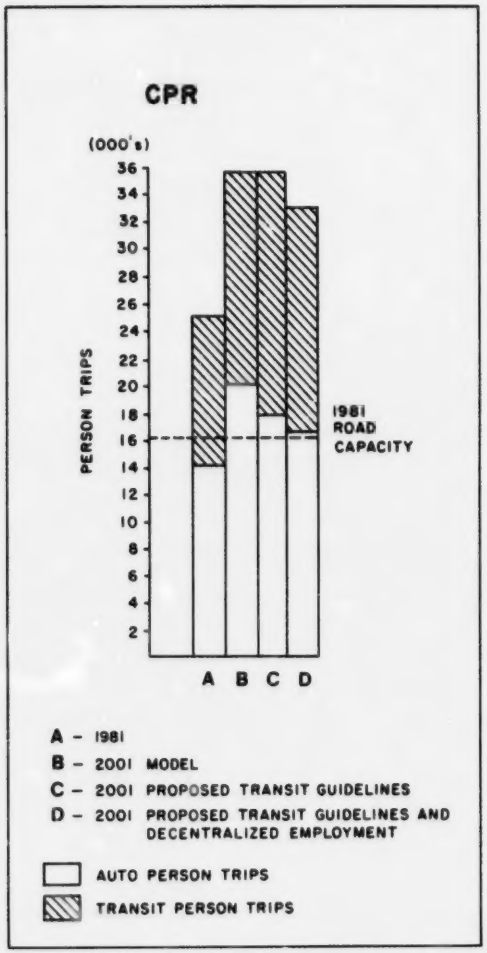
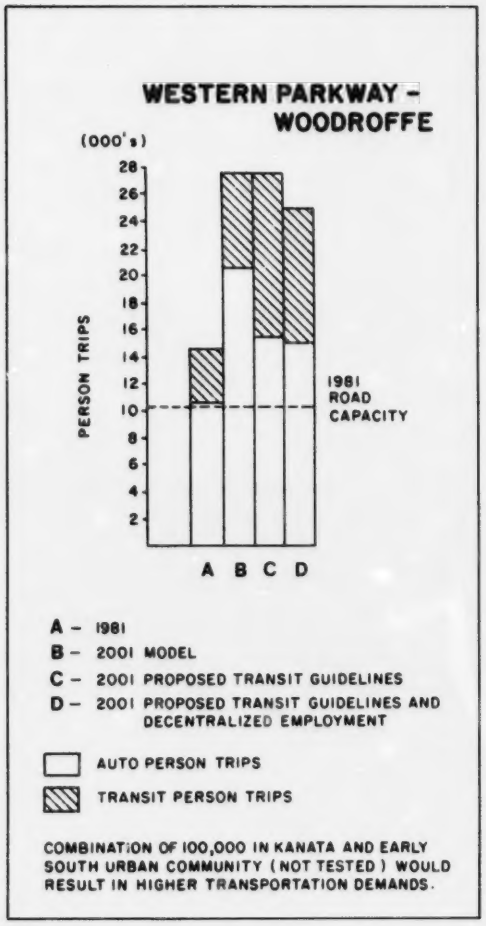



**FIGURE : 3** (Cont'd.)



Examination of the results in Fig. 3 shows the following:

- There will be a substantial increase in transportation demand by 2001 across all screenlines.
- Achievement of the proposed transit modal split guidelines results in increased transit usage and hence a decline in auto person trips.
- High employment levels in Kanata and Orleans will reduce the total number of trips across all screenlines, but more particularly across the critical suburban screenlines along the east-west corridor.
- When coupled with the proposed transit modal split guidelines significant reductions in auto demand result when compared to the output from the model shown in the second bar.

Travel volumes reaching or exceeding of capacity indicate potential capacity deficiencies and congestion problems. The extent of future road requirements over and above the existing situation can be estimated by reference to the dashed lines in Fig.3.

The extent to which new lanes may be required to meet projected travel demand across screenlines under the possible circumstances is shown in Fig. 4. It shows that the combination of higher transit modal split coupled with high levels of employment in the urban communities will minimise road requirements across screenlines. It also shows the degree of variation across each screenline depending on the degree to which transit modal split and employment levels are attained. Fig. 5 summarises the roads available in 1981 and their capacity and potential roads to meet the deficiencies identified in Figs. 3 and 4.

**FIGURE : 4**

TRANSPORTATION DEMAND BY SCREENLINE HIGH POPULATION OPTION

| | 1981 Capacity in vehicles/ low | 0.9 Vehicle Capacity | Worst Case | | New Transit Guidelines | | Employment decentralization and new transit Guidelines | |
|---|---|---|---|---|---|---|---|---|
| | | | Vehicle Demand | Deficiency | Vehicle Demand | Deficiency | Vehicle Demand | Deficiency |
| Green Creek | 5,000 | 4,500 | 8,400 | 3,900 | 7,500 | 3,000 | 5,200 | 700 |
| Rideau River North | 12,200 | 11.000 | 13,700 | 2,400 | 11,500 | 500 | 10,300 | - |
| Leitrim Ramseyville | 9,600 | 8,600 | 2,700 | - | 2,700 | - | 2,600 | - |
| CNR East | 5,000 | 4,500 | 3,900 | - | 4,200 | - | 3,200 | - |
| Fallowfield | 4,800 | 4,300 | 6,300 | 8,000 | 5,500 | 800 | 2,900 | - |
| CNR West | 5,100 | 4,600 | 7,100 | 2,500 | 7,000 | 2,400 | 4,800 | 200 |
| Eagleson | 5,300 | 4,800 | 7,600 | 2,800 | 7,500 | 2,700 | 6,300 | 1,500 |
| Parkway Woodroffe | 7,900 | 7,100 | 13,400 | 6,300 | 11,200 | 4,100 | 10,200 | 3,100 |
| CPR | 12,400 | 11,200 | 12,900 | 1,700 | 12,200 | 1,000 | 11,300 | 100 |
| Rideau River South | 3,100 | 2,800 | 5,000 | 2,200 | 4,600 | 1,800 | 2,600 | - |
| Ottawa River | 9,800 | 8,000 | 9,800 | 1,000 | 8,200 | - | 8,000 | - |

Capacity of one lane 700-1400 depending on its type e.g. arterial, freeway

**FIGURE : 5**

CAPACITY IN VEHICLES PER HOUR OF ROADS BY SCREENLINE 1981 AND POSSIBLE FUTURE POTENTIAL

| Screenline | Road | 1981 Capacity | Potential Future Capacity | Comments |
|---|---|---|---|---|
| Green Creek | Queensway | 3,000 | 3,200 | Extension of 4 lanes. East |
| | Montreal Road/ St. Joseph | 1,000 | 1,400 | 4 lane |
| | Innes Road | 1,000 | 1,400 | 4 lane inc. Blackburn Hamlet by-pass |
| | Ottawa River Parkway | | 1,400 | 4 lane |
| | Walkley-Innes | | 2,100 | 6 lane |
| Rideau River North | Bronson Avenue | 1,650 | | |
| | Bank Street | 1,300 | | |
| | Smythe Road | 1,450 | | |
| | Queensway | 4,000 | 5,000 | One additional lane |
| | Montreal Road | 1,200 | | |
| | St. Patrick Street | 1,400 | | |
| | Vanier Parkway | | 1,700 | 6 lanes |
| | Sussex Drive | 1,200 | | |
| | Nicholas-Industrial | | 1,400 | 4 lanes |

**FIGURE : 5** (Cont'd.)

CAPACITY IN VEHICLES PER HOUR OF ROADS BY SCREENLINE 1981 AND POSSIBLE FUTURE POTENTIAL

| Screenline | Road | 1981 Capacity | Potential Future Capacity | Comments |
|---|---|---|---|---|
| Leitrim | | | | |
| Ramseyville | Baseline Road | 900 | | |
| | Anderson Road | 900 | | |
| | Highway 417 | 3,200 | | |
| | Russle Road | 900 | | |
| | Hawthorne Road | 900 | | |
| | Highway 31 | 1,400 | | |
| | Albion Road | 500 | | |
| | River Road | 900 | | |
| CNR East | Hawthorne Road | 900 | | |
| | Conroy Road | 600 | | |
| | Bank Street | 1,400 | | |
| | Airport Parkway | 700 | 3,000 | Twin existing facility grade separated |
| | Riverside Drive | 1,400 | | |
| Fallowfield | Moodie Drive | 900 | | |
| | Cedarview Road | 900 | - | Remove from system |
| | Greenbank Road | 700 | 1,400 | 4 lane |
| | Woodroffe Avenu | 700 | 1,400 | 4 lane |
| | Merivale Road | 700 | 1,400 | 4 lane |
| | Highway 16 | 900 | | |
| | Highway 416 | | 3,200 | 4 lane freeway |

**FIGURE : 5** (Cont'd)

CAPACITY IN VEHICLES PER HOUR OF ROADS BY SCREENLINE 1981 AND POSSIBLE FUTURE POTENTIAL

| Screenline | Road | 1981 Capacity | Potential Future Capacity | Comments |
|---|---|---|---|---|
| CNR West | Highway 16 | 900 | 1,200 | 4 lane |
| | Merivale Road | 1,100 | 1,400 | |
| | Greenbank Road | 1,200 | 1,400 | |
| | Cedarview | 500 | - | remove from system |
| | Highway 416 | | 3,200 | 4 lane freeway |
| Eagleson | RR 248 | 900 | 1,400 | 4 lane |
| | Queensway | 3,200 | | |
| | Corkstown Road | 500 | | |
| | Carling Avenue | 700 | 1,400 | 4 lane |
| | Richmond Road/ Fernbank | - | 1,400 | 4 lane |
| | Timm Drive extension | - | 1,200 | 4 lane |
| Western Parkway | Richmond Road | 800 | 1,400 | |
| | Carling Avenue | 2,000 | | |
| | Queensway | 3,200 | 4,200 | Additional lane |
| | Baseline | 1,400 | 2,100 | 6 lane |
| | Knoxdale/Hunt Club | 500 | 2,100 | 6 lane |
| | Britannia Parkway | | 1,700 | 4 lane |

**FIGURE : 6** (Cont'd.)

CAPACITY IN VEHICLES PER HOUR OF ROADS BY SCREENLINE 1981 AND POSSIBLE FUTURE POTENTIAL

| Screenline | Road | 1981 Capacity | Potential Future Capacity | Comments |
|---|---|---|---|---|
| CPR | Ottawa River Parkway | 1,700 | | |
| | Scott Street | 1,200 | | |
| | Somerset Street | 1,000 | | |
| | Gladstone Avenue | 600 | | |
| | Carling Avenue | 1,500 | 2,100 | 6 lane |
| | Prince of Wales Drive | 1,000 | | |
| | Colonel By Drive | 600 | | |
| | Wellington/Albert) | | | |
| | Preston-Chaudiere) | | 900 | |
| | Queensway | 4,800 | 5,800 | additional lane |
| Rideau River South | Hogs Back | 600 | | |
| | Heron Road | 2,500 | | |
| | Hunt Club | | 2,500 | 6 lane |
| Ottawa River | Champlain Bridge | 1,500 | | |
| | Chaudiere Bridge | 1,600 | | |
| | Portage Bridge | 2,100 | 2,400 | Bronson connection |
| | Alexander Bridge | 1,300 | | |
| | MacDonald Cartier Bridge | 3,300 | 4,000 | Vanier Parkway connection |